CONSUMER ALERT! NEW RELIABILITY RATINGS FOR TOP PC MAKERS

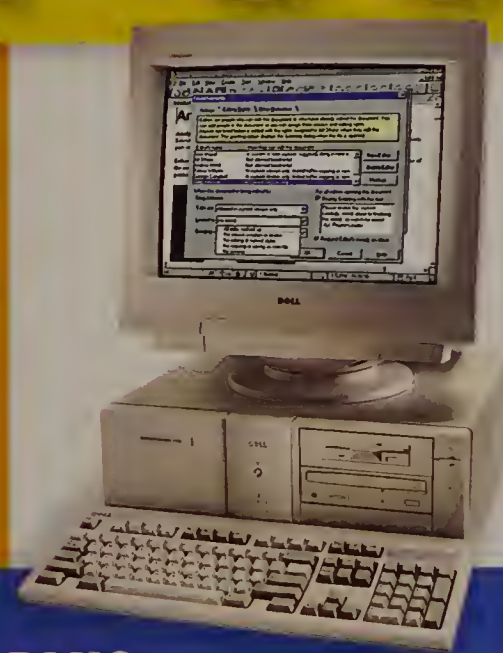
TOP 10 PRINTERS, MONITORS, AND MORE

PC WORLD

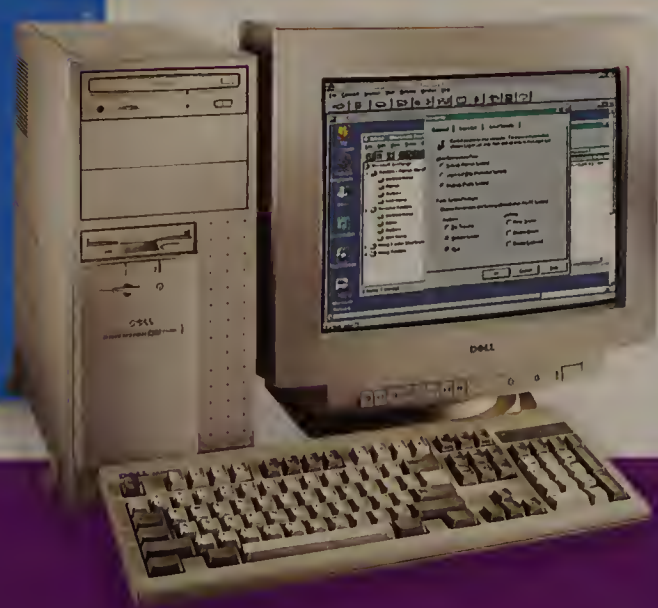
March 1996

EXCLUSIVE! PC WORLD BENCH First Tests With Real Win 95 Apps!

BEST PCs FOR WINDOWS 95



109 Systems Reviewed, from Dirt-Cheap Pentium-75s to Rip-Roaring Pentium-166s



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The programs also get out of your way by revealing their capabilities intuitively. IntelliSense™ technology inside Microsoft Office means each program can sense what you are trying to do and actually execute many formatting and repetitive data entry tasks automatically. Not in a "mind of its own" sort of way, but in ways that accelerate the pace of your work. (To create a numbered list in Word, you just type *1.* and your thought, hit Enter, and *2.* appears automatically.) If you ever have a question on how to do something, just type it in using your own words, and the Answer Wizard will walk you through the task step-by-step.

This is Microsoft Office for Windows 95. Using the power and simplicity of the Windows 95 operating system to let you focus on your work, not on your software.

To see a Microsoft Office demo and download free software, go to http://www.microsoft.com/msoffice

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no wa

No barriers between your ideas and other people.

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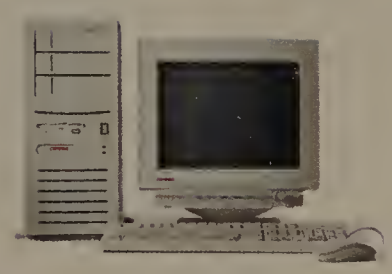

	575e	5120e	5100	5133
Processor	Pentium 75MHz	Pentium 120MHz	Pentium 100MHz	Pentium 133MHz
Std./Max. Memory	8MB/136MB	8MB/136MB	16MB/192MB	16MB/192MB
Hard Drive	630MB or 1GB	630MB or 1GB	630MB or 1GB	1GB
Cache Internal	16KB	16KB	16KB	16KB
Cache External	256KB (optional)	256KB (optional)	256KB	256KB
Architecture	PCI	PCI	TriFlex/PCI	TriFlex/PCI
Video Memory/Max.	1MB/2MB	1MB/2MB	1MB/2MB	1MB/2MB
Compaq 150 Color Monitor	Yes	Yes	Yes	Yes
Diskette Drive	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB
Expansion Slots (Total)	3	3	4	5
Drive Bays (Total)	3	3	4	5
Ports: Serial/Parallel	1/1 (ECP)	1/1 (ECP)	1/1 (ECP)	1/1 (ECP)
Security Features	Yes	Yes	Yes	Yes
Processor Upgradable	Yes	Yes	Yes	Yes
101-Key Keyboard, Mouse	Yes	Yes	Yes	Yes
Software Preinstalled (Choice of)	MS-Windows® 95 or MS-Windows 3.1	MS-Windows 95 or MS-Windows 3.1	MS-Windows 95 or MS-Windows 3.1	MS-Windows 95 or MS-Windows 3.1
Energy Star Compliant	Yes	Yes	Yes	Yes
Limited Warranty*	3-Year	3-Year	3-Year	3-Year
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PC WORLD

Cover Story

104 Top 20 PCs: Best PCs for Windows 95
In this month's Top 20 system review, *PC World* introduces PC WorldBench, the first and only Windows 95–based test suite for assessing PC performance. With tests of more than a hundred PCs running popular 32-bit applications, this review marks the first in-depth, real-world evaluation of PCs for use with Windows 95. The new desktop and notebook champs: the Dell Dimension XPS P120c and P75t, and Toshiba's Satellite Pro 400CDT and Satellite T2130CS.

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Cover photography by Robert Cardin

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Finally,
a multimedia
notebook
powerful
enough to
replace your
desktop.

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The Millennia TransPort

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Common Features
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- PCI 64-bit graphics accelerator, 1MB RAM
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- Nylon carrying case
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- Microsoft Office Pro 95 and Bookshelf 95 CDs
- 5-year/3-year Micron Power℠ limited warranty*

Micron Millennia TransPort P133
- Intel 133MHz Pentium processor
- 11.3" active matrix color display, 800 x 600
- 32MB EDO memory (48MB max.)
- 1.3GB removable hard drive
- 2nd intelligent modular lithium-ion battery
- Motorola® Montana 28.8 fax/modem

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- Intel 133MHz Pentium processor
- 11.3" active matrix color display, 800 x 600
- 16MB EDO memory (48MB max.)
- 1.3GB removable hard drive
- 2nd intelligent modular lithium-ion battery

$4,899 Business lease: $167/month

Micron Millennia TransPort P120
- Intel 120MHz Pentium processor
- 11.3" active matrix color display, 800 x 600
- 16MB EDO memory (48MB max.)
- 1.3GB removable hard drive

$4,499 Business lease: $153/month

- Intel 120MHz Pentium processor
- 11.3" dual scan color display, 800 x 600
- 16MB EDO memory (48MB max.)
- 810MB removable hard drive

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intel inside pentium PROCESSOR

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PC Magazine – Sept. 12, 1995, on the SyncMaster 17GLi and 17GLsi monitors.

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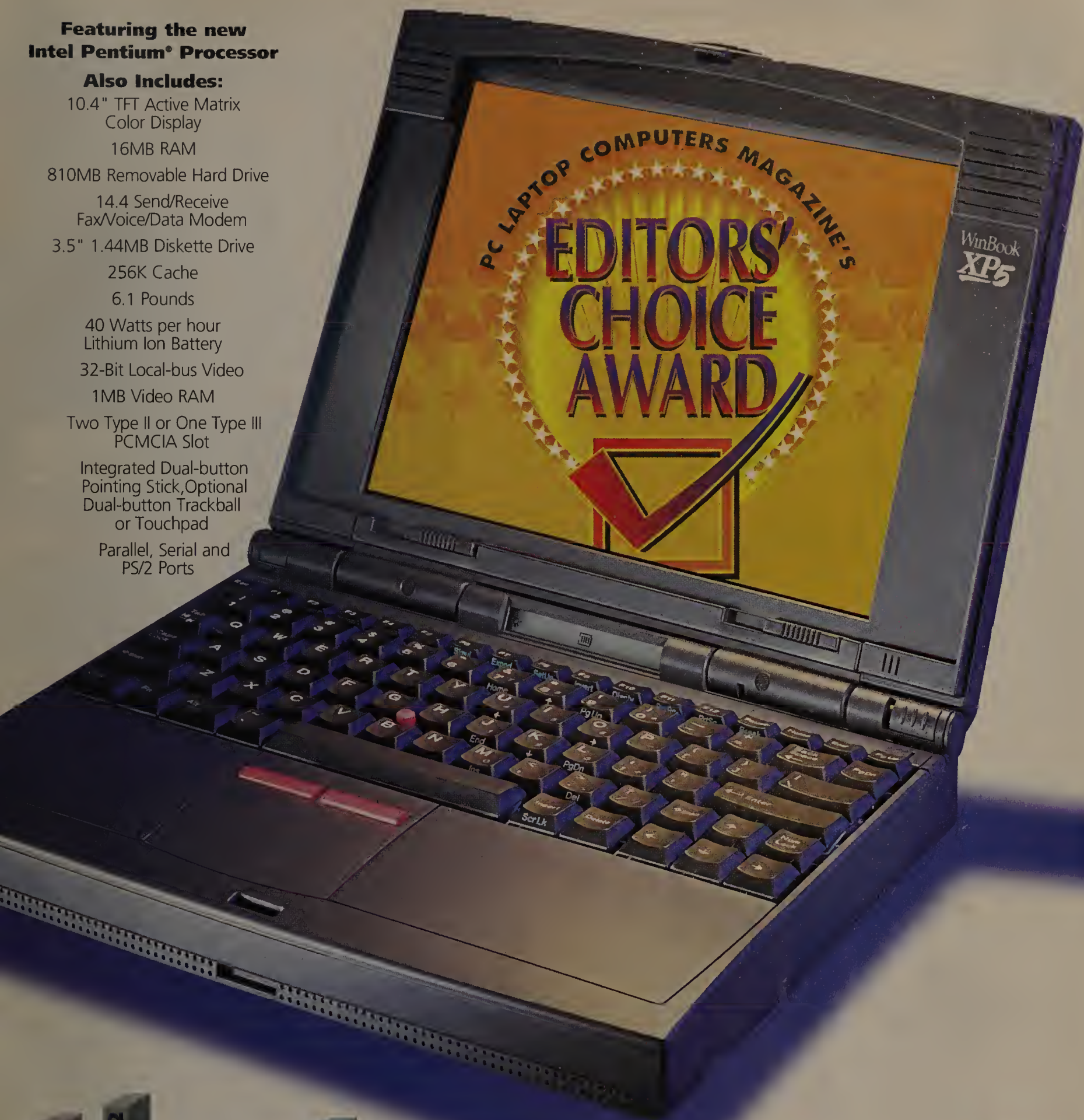

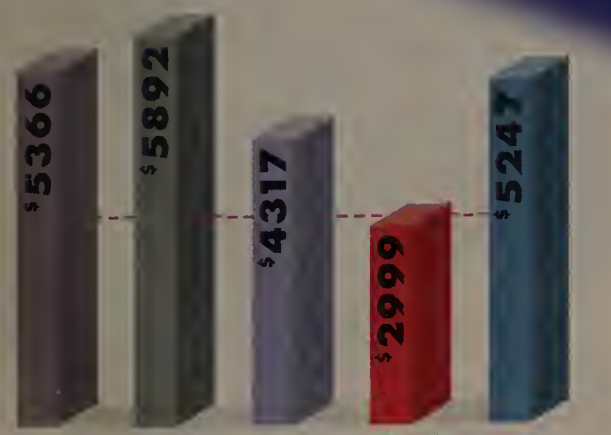

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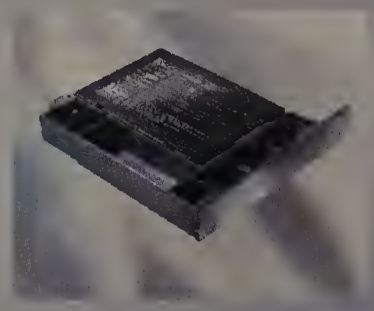

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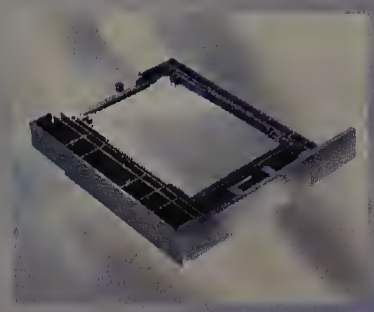

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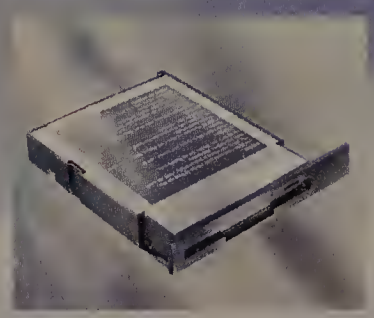

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PC WorldBench, the First Real-World Benchmark for Win 95

Fifteen long months ago, *PC World* started planning a project that debuts in this issue: PC WorldBench version 1.0, the first full-fledged Windows 95 benchmark for assessing PC performance.

Responsible for this feat, which proved to be far nastier than we ever suspected, is the happy crew at right. Throughout late summer and fall, as software companies released Windows 95 applications, this group swung into action to move PC WorldBench out of the lab and into the magazine. These 23 people, plus a SWAT team of 35 additional contractors, hammered out goals and specifications for the benchmark, programmed a user interface and application scripts, ordered test systems, began beta testing, analyzed results, revised scripts, ordered more test systems, reran the benchmarks, analyzed results, wrote reviews, revised scripts, reran the benchmarks, rewrote reviews, ad infinitum. In all, the group debugged 60 revisions of scripts and tested a total of 164 PCs. In the end, 109 systems vied for spots on this month's Top 20 charts; the best of them appear in our cover story, "Top 20 PCs: Best PCs for Windows 95."

During the course of the project, weekends disappeared. Holidays became meaningless. Ulrike Diehlmann, our manager of performance testing, grew to love her low-tech answering machine, which intercepted frantic calls from staff from 5 a.m. to 2 a.m. Tempers flared. Mistakes were made. But the group ultimately succeeded.

How WorldBench Works

PC WorldBench was no simple task because, in keeping with *PC World*'s philosophy of real-world testing, it measures PC performance by running real software and tasks typical of our readers' actual computer use. Its basic specs: Its user interface is a 32-bit Windows 95 program. It utilizes three 32-bit Windows 95 applications and three 16-bit Windows 3.1 apps, which represent the types of software our readers will use in the coming year. The Win 95 apps are Microsoft Word, Microsoft Excel, and Micrografx Picture Publisher. Windows 3.1 applications include Lotus 1-2-3, Borland Paradox, and Novell WordPerfect.

The PC WorldBench team includes PC World Test Center and reviews department staff, plus contractors. From left, front row: Test Center Director Julian Milenbach, Sharyl Loggins, Stephen Hassett, Kevin Mitchell; second row: Brad Grimes, Susan Silvius, Melissa Riofrio, David Bronsen; third row: Derrick Sakai, Mike Salayko, Ulrike Diehlmann, Arden Hoffman, Eric Hellweg, Carla Thornton; fourth row: Dave Casini, Julian Weatherby, Andrew Hawn, Jeff Kuta, Tracey Capen, Rex Farrance, Bryan Hastings. (Missing: John Goddard and Ann Cassidy.)

PC WorldBench executes for each application a script that performs common tasks such as opening and saving files, scrolling through documents, recalculating spreadsheets, and printing. The benchmark generates a score for each application as well as an overall PC WorldBench score. Turn to this month's Top 20 PCs review to see which systems excel under Windows 95 and PC WorldBench.

Coming to Your Own PC

Programming continues on PC WorldBench, with the goal of releasing it on CD-ROM by June. The benchmark will run on a wide range of PCs, from basic 486s to high-end Pentium Pros. By running PC WorldBench on your own system, you'll be able to compare its score to those published in *PC World*'s Top 20 reviews. PC WorldBench does not include "light" versions of the applications it uses. Instead, it requires that the real applications be installed on the system under test; if only some of the applications are present, the benchmark will run scripts for those applications only. PC WorldBench must run all six scripts to produce an overall performance score.

We will revise PC WorldBench annually to include new software releases and enhance the program itself. If and when warranted, we'll increase the percentage of 32-bit applications it uses.

In the meantime, we at *PC World* thank the WorldBench team for rejecting the easy course of just running old 16-bit applications and calling it a Windows 95 benchmark. It was harder to include real Windows 95 applications, but it makes the benchmark a far better measure of performance for all those buying Windows 95 PCs.

Cathryn Baskin, Editor

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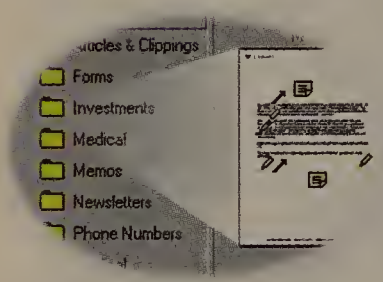

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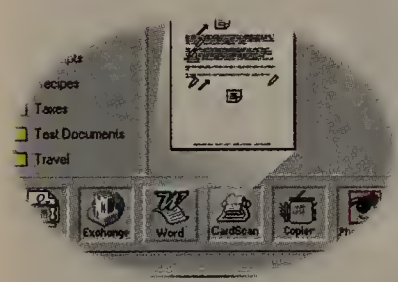

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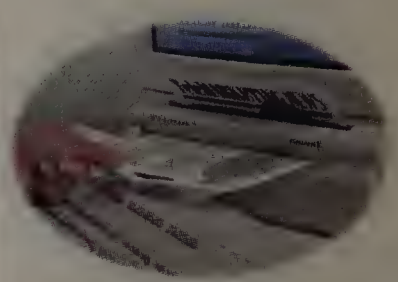

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RAM Double Trouble, Another Way to Cast Your Net

Strength in Stability

Your January article ["RAM Doublers No Substitute for Real RAM," *Top of the News*] contained some valid points but missed what I feel is the major benefit of these tools: stability. Several users in the company I work for were having problems running even two Windows applications simultaneously. RAM Doubler does a very good job of keeping Windows' free resources above the "crash line." Those using RAM Doubler would cut off my hands if I tried to uninstall the product.

If RAM Doubler had a more appropriate name, maybe everyone would understand its real strength.

Rob Cooper,
Kitchener, Ontario, Canada

Putting RAM Doublers to the Test

Everybody knows that more physical RAM is better than some software gymnastics, but what about the home user with 4MB of RAM who can install software but doesn't dare mess with the hardware? Your "RAM Doublers No Substitute for Real RAM" article doesn't seem like a fair test of the products' usefulness in the most likely situation of need.

I know from my own experience that Word 6.0 for Windows 3.1 runs pretty slowly in 4MB and accesses the swap file a lot. I solved the problem by buying more RAM, but for other people with only 4MB it's an important question whether performance of a single major application, like Word 6.0, can be improved just by installing RAM doubling software.

A second question the article did not answer is the situation of someone who needs to switch between two applications on a 4MB machine. If the two applications require extensive swapping in a standard setup, will installation of a RAM doubler reduce or eliminate swapping? This could be a critical question for someone with a 4MB laptop to which adding more RAM is difficult, expensive, or even impossible.

Don Tucker, America Online

Editor's response: The point about stability is an excellent one, and our testing showed, in fact, that good RAM doublers allow users to load and run more applications—a capability many people need. We did not test for swap speed or frequency of system crashes in baseline or doubled scenarios. Our testing did, however, demonstrate that all RAM doublers will slow system performance, even when you're running a single application. —*Andy Reinhardt, executive editor*

More Search Engines

Your article "Find It on the Net" in the January issue was excellent. As is usual with *PC World*, it was very informative and useful. There is another search engine that might be of interest, called Four 11 White Page Directory. It can be found at **http://www.Four11.com/**. This Internet search tool is useful for finding someone you know who has an e-mail address.

Dennis Thiel, Internet

Leading Roles in Software

It's about time! Bronwyn Fryer's article "Sexism and Kids' Software" [*Consumer Watch*, December] is something many parents have been discussing for quite a while now. From Aladdin to Hyperman, a great majority of the software products available for children have males playing the lead.

When will software developers catch on to the fact that our daughters do not need to be rescued, and that women are capable of playing something other than supporting roles? It is way past time to stop teaching girls to wait for their prince to come. Conversely, we would also like our sons to experience themselves as something other than "hero" superprotectors. Thank you for covering an important topic.

Ann Kara, Newport Beach, California

Top of the News

RAM Doublers No Substitute for Real RAM

TEST DRIVE

The claims sound like a get-rich-quick scheme. Buy our software and turn your 4MB weakling into an 8MB contender or your 8MB yawner into a 16MB screamer! Promises one advertisement "Instantly speed up Windows 95 and Windows 3.0 and higher." But can a $50 software package really provide the same benefits as $200 or $400 worth of real RAM? Does it boost performance and let you load more applications?

Our mission was to discover if RAM doubling software really works. For Windows 3.1, we tested whether RAM doublers let you open more applications in the same amount of memory. For Windows 95, our goal was different: Given that Microsoft recommends 8MB of RAM to run Windows 95, can you get by with only 4MB and a RAM doubler? And since our previous tests show that you need 16MB of RAM for optimal Windows 95 performance, how well will you do with 8MB and a RAM doubler?

The short answer: No free lunch here. Most of these programs offer more benefit under Windows 3.1 than they do under Windows 95. But under Windows 95, none of them provides the advantages that you get from popping in more RAM; in fact, these programs actually slowed down our performance by as much as 40 percent.

More Apps for a Small Price

We looked at three programs: RAM Doubler from Connectix, MagnaRAM 2 from Quarterdeck, and SoftRAM95 from Syncronys Software. RAM Doubler, the most seasoned of the bunch, is one of the best-selling Windows 3.1 utilities. At press time no Windows 95 version was available, although Connectix has disclosed plans to release one soon. Both MagnaRAM 2 and SoftRAM95 ship in boxes that include versions for both Windows 3.1 and Windows 95. (As we went to press, Syncronys Software announced it would relabel its box to say that SoftRAM95 is meant for use only with Windows 3.1.)

Under Windows 3.1, an 8MB PC with no RAM doubling software installed could load ten programs before it ran out of system resources (see chart at left). With RAM Doubler, we could load ten additional apps or files, but RAM95 let us load only four additional apps. With MagnaRAM 2, the system ran out of capacity with one less program loaded than our baseline 8MB model had.

Unfortunately, all three Win 3.1 RAM doublers slowed the performance of a Word macro running alone by roughly 2 to 6 percent. With five applications loaded in the background, the Word test ran about 5 percent slower when either RAM Doubler or SoftRAM95 was installed than it did on a plain system; MagnaRAM 2 dragged performance down by more than 50 percent. (Jan Gold, a senior product manager for Quarterdeck, says you can improve performance by tweaking MagnaRAM 2's threshold and buffer sizes, but we chose to use settings recommended by the software during installation.)

With 14 apps in memory and RAM Doubler running, the Word test took more than twice as long to complete as it did with no other apps loaded. SoftRAM95 fared a bit better under the same circumstances: The Word test took merely 73 percent longer to run. Of course, without the RAM dou-

Some Let You Run More Apps in Windows 3.1

Available system resources — Number of programs and files loaded — 8MB baseline system — Quarterdeck MagnaRAM 2 — Syncronys SoftRAM95 — Connectix RAM Doubler

Methodology: All tests ran on a Compaq Deskpro 4/66 with a 486DX2-66 CPU, 8MB of RAM, no secondary cache, a 500MB IDE hard drive, Windows 3.11, and a 20MB permanent swap file. We ran a Word macro on Word 6.0c with no other applications loaded in the background and then loaded Excel 5.0c, Freelance Graphics 1.0 for Windows, Windows File Manager, Paradox 3.5 for DOS, AllpaGash 3.0 for Windows, Sidekick 2.0 for Windows, Powerpoint 4.0c, Dashboard 3.00 for Windows, Lexpunk 6.00 for Windows, three Windows 3.1 applets (Paintbrush, Terminal and Notepad), and MS Test 1.0. We defragmented our hard drive and rebooted between trials.

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JOHN GREENLEIGH

P.C. World

I just finished reading "Sexism and Kids' Software." That's all very fine and well that Fryer feels opposed to the traditional roles of women in our society, but I hardly think a computer magazine is the appropriate forum to express such opinions. I read your magazine to learn about computers. Please stick to what you know best.

Benjamin Forest, Layton, Utah

Awaiting the Final Verdict

Usually your coverage of PC hardware and software is unbiased, fact based, and thorough. However, Steve Bass's article "Danger on the Desktop" [*Home Office*, December] was anything but unbiased. Bass quotes a single Finnish study linking electromagnetic fields to health problems, and then he

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uses it to scare the readership away from every electrical appliance in their midst.

The article correctly states, "the final verdict isn't in yet," but then ignores that statement and seems to assume that EMFs have been incontrovertibly proven to be a health hazard. The fact is that there is at least as much scientific data refuting the Finnish study as there is supporting it.

Consumers should be aware of this topic and make informed decisions based on all available data. This article does not present both sides of the issue, and thereby does a disservice to your readers.
David E. Carr, Reading, Massachusetts

Author's response: True, the final verdict isn't in. But in the meantime, it doesn't take much to stand back from my microwave oven or substitute a battery-operated alarm clock for an electric one. That way, if the verdict is guilty, I'll still be set free. *—Steve Bass*

Don't Talk Down to Me

In the past three years, *PC World* has been the only computer magazine I've found that brings the reader up to the writer's level of knowledge rather than writing down to the reader's level of ignorance. Demographic changes such as the explosion of "newbies" into the home computer world may provide the opportunity for an influx of new subscribers, but caution should be taken not to ostracize the customers who have made the magazine what it is today.
Glenn S. Laniewski, Caldwell, New Jersey

Technology Hows and Whys

I have subscribed to *PC World* for several years. But the magazine seems interested in testing and comparing the products and fails in explaining why. I rarely see you introduce the functionality of new products. For example, recently I noticed that some manufacturers have put EDO memory into their products, but I have not seen any *PC World* articles give some explanation as to what this is and how it differs from regular DRAM. I believe many readers are interested in not only how a product performs, but why as well.
Hongjian Yu, Internet

Editor's response: *PC World* is indeed interested in testing and comparing products to identify their benefits rather than in-depth technical details. Nonetheless, when a new technology appears, we do make it a practice to define it and describe what makes it different. In regards to your example, check out Eric Knorr's October 1995 *Hardware* for an explanation of EDO RAM. *—Shane Rau, technical editor*

Treacherous Curves

Something bothers me about the new PCs by Acer and HP. Their Aspire and Pavilion product lines have unique, curvy lines on their minitower cases. They look nice, and the computer industry needs the more user-friendly appearance these machines put forth. But if I wanted to put my standard 3½-inch disk drive–size tape backup drive into one of the computers, how ugly would that look? It doesn't look like my rectangular tape drive would conform to the case shapes. And what if later I wanted to upgrade the CD-ROM drive? How practical are these new designs if they can't accommodate standard peripherals?
Quan Ha, Fullerton, California

Editor's response: You make a good point about these stylish new computers. And it's a point that wasn't missed by the computers' designers. Both the HP and the Acer have curvy designs that would look awful with square add-on parts. Fortunately, the vendors have put doors on the front of the machines. Open the door and install your tape backup, new hard drive, or whatever. Shut the door and you are back to your smart, curvy design. No problem. *—Christina Wood, senior associate editor*

Revolutionary Warp

PC World does a good job explaining the features of Windows 95. However, many of the features that are mentioned as a new revolution in computing, OS/2 had years ago. A case in point: In "95 Essential Tips for Windows 95" [January], you mention that applications can be started with the "start" command in a DOS session. OS/2 has had that option for years. Even configuration folders, with their tab design, look like they were taken from OS/2.

I agree that Windows 95 has a better shell than OS/2, but it's only a matter of months before the step-up from Warp is

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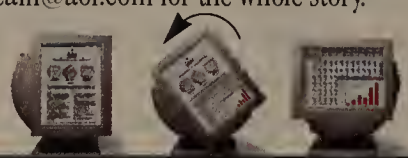

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going to blow the socks off people. OS/2 will once again lead the way in PC operating systems, but the best features will be gobbled up by Microsoft and placed in its Windows series.

Brian S. Paskin,
Narragansett, Rhode Island

Sorry, Wrong War

This is likely not the first or last letter regarding the review of The Alamo CD-ROM "Victory or Death" ["Editors' Choice: 75 Best CDs," December]. Many Texans will be writing to tell you that the most honored battle in Texas history, the Siege of the Alamo, actually occurred in the Texas Revolutionary War, to win independence from Mexico. The Mexican-American War came later, after Texas joined the United States.

Don Palmer, Rowlett, Texas

Moving Violation

I find it ironic that on my PC each time I attempt to run the CD-ROM that came with Bill Gates's book *The Road Ahead*, Windows 95 tells me it's performed an illegal operation and shuts the application down. Seems there's potholes developing on the information superhighway.

Daryl Davis, Ringtown, Pennsylvania

Corrections and Clarifications

The correct Internet address for PolyView (*Windows*, January) is **polybytes@kagi.com**.

In our January system review ("It's a Buyer's Market"), we incorrectly stated the refresh rate for the 15-inch monitor that comes with the CompuTrend Premio 5x86-100. At 800 by 600 resolution the rate is 72 Hz.

An incorrect telephone number was printed in January and February for Toshiba America Information Systems. The correct number is 800/457-7777.

"Quick and Dirty Backup" (*New Products*, December) should have stated that Iomega's Ditto Easy 800 holds 800MB of compressed data and 400MB of uncompressed data.

PC World regrets the errors.

Letters *welcomes your responses and ideas.* *See page 14 for contact information.*

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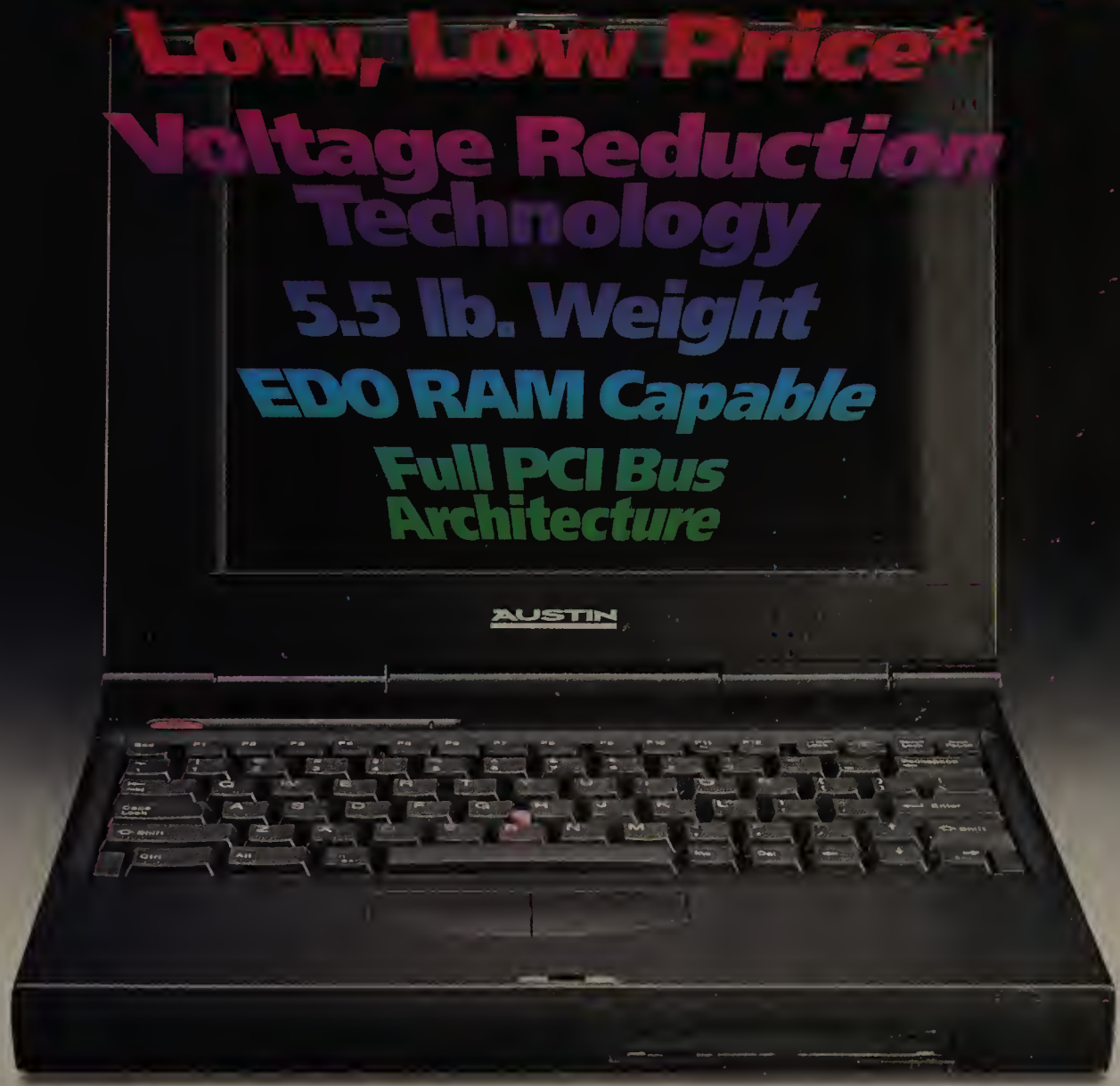

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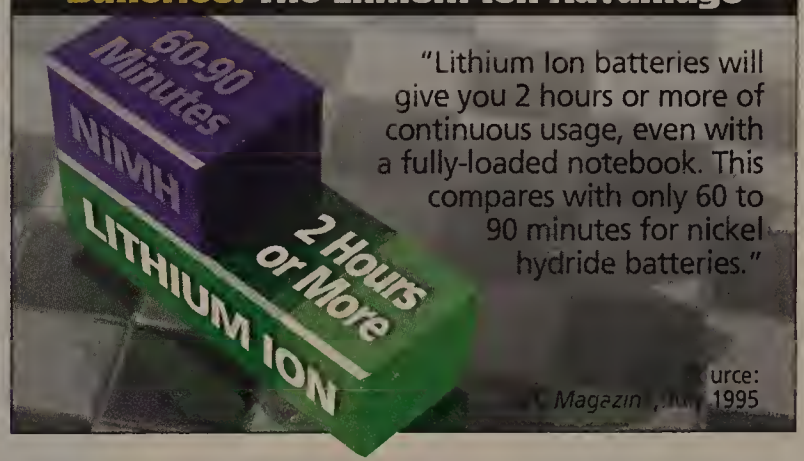

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Windows 95: Managing a Massive Move

Long file names and a simpler, streamlined interface may make Windows 95 easier for everyday users. But for large businesses running many different kinds of computers, operating systems, and networks, switching thousands of workers to Microsoft's new operating system is the logistical equivalent of Operation Desert Storm. Without careful implementation, the ensuing conflicts with existing hardware and software can wreak havoc on corporate tech support. This month Charles Hofferber, manager of network services for Integris Health, the largest health care organization in Oklahoma, tells how his company survived the move. —*Editor*

No Do-It-Yourself Job

As any technical manager can tell you, supporting the legion of computer users in a big company is usually like a five-ring circus. Throw a new operating system into the works, and it's more like a major earthquake.

At Integris Health, we run an incredibly complex computing environment. In our 14 hospitals, administrators and health professionals all need access to multiple platforms and systems simultaneously. Practically all of our 8000 workers must have access every day to dozens of departmental bread-and-butter database applications—including claims processing, patient scheduling, treatment protocols, tracking, finance, and preventive maintenance.

These programs reside on big iron, Digital VAX and Alpha servers running under a multiprotocol network. We're also running Novell NetWare, Windows NT, UNIX, TCP/IP, and Digital Pathworks network operating systems to connect UNIX workstations, mainframe terminals, and PCs using off-the-shelf applications such as WordPerfect and Excel. Altogether, we have 20 different hardware and software platforms.

When we first heard about Windows 95, we thought it might solve some of the more severe problems we often encounter, like low memory warnings and the inability to easily call up DOS-based databases.

Before Windows 95, our PC users would have to reboot constantly, depending on whether they wanted to use their Windows applications or the mainframe-based databases. But spending up to 10 minutes per reboot, often five times a day, resulted in lost productivity amounting to hundreds of thousands of dollars a year, and people were understandably frustrated.

Windows 95 may be relatively simple to install on a home PC, but in a large, complex networked environment like ours, it's a huge undertaking. We knew, for example, that Windows 95's myriad features and functions would create much more traffic on the network. All our hardware and software would have to be adjusted—and resetting network protocols and configurations is a tricky, exacting business.

We simply didn't have the resources to do it: Our 20-person technical staff was already overloaded just keeping the computers and networks running smoothly. I estimated that performing the necessary planning, testing, and prototyping to ensure that Win 95 would work well in our environment would take 5 of my full-time staffers 18 months—it would have cost us well over $100,000 in labor. Even if the staffers had the luxury of time, they lacked the expertise to integrate Windows 95 with all our networks and platforms.

Charles Hofferber is manager of network services for Oklahoma-based Integris Health.

Clearly, we needed help to meet our objective of getting Win 95 quickly to the desktops. We needed someone with deep access to Microsoft information and the ability to do the entire range of tasks—planning, testing, prototyping, troubleshooting, implementing, documenting, and training—so that our own staff could easily take over once the upgrade was complete.

After assessing possible consultants, we selected Digital Equipment Corporation's Technology Migration Services. To create this group, Digital had worked with Microsoft to develop a staff of experts who could identify and resolve all the issues that occur in mixed-platform environments.

In the last week of September 1995, I identified a target list of 100 PCs for the Digital team to start with. Digital got the hot spots—all the systems where we anticipated problems, or

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where we would have trouble uncovering problems ourselves. For example, Windows 95 didn't recognize the Digital Etherworks Ethernet cards that we use, so the team had to manually adjust the install process. Also, some of our terminal emulation software that talks to the mainframe applications needed new drivers.

The SWAT Team Swoops In

By the end of November, the team's testing was complete and implementation was well under way. Once the 100 problem upgrades were complete, the team departed, leaving behind documentation so that my staff could easily continue the upgrade process. As of February 1996, 500 PCs were up and running under Windows 95, and any other users who wished to run it were able to install it from the network.

As the upgrades were completed, however, other unforeseen problems started appearing. Some printer drivers and laptop configurations, for example, had to be updated to work with Win 95. The Digital team returned to help with these upgrades and revise the documentation accordingly.

Because Windows 95 solves our multiple-network problems, calls to our tech support department have gone down by 20 percent, while the time needed to access databases has noticeably improved, with reboots no longer necessary. In addition, our documentation now shows every detail of our networks in black and white.

The moral of the story? When you're talking about switching hundreds or thousands of end users to a completely new operating system, there's no such thing as simplicity. Even when you have brilliant staff technicians, there are times when it just doesn't pay to do it yourself. Also, when you're shopping around for outside help, make sure you get the right kind.

- **Digital Technology Migration Services**
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Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay $300 for published columns. See page 14 for contact information.*

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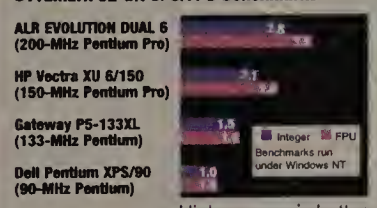

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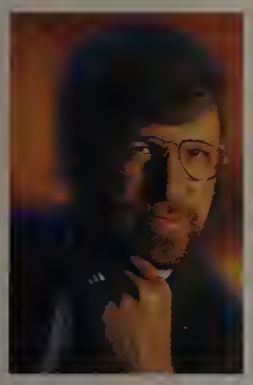
Digital Versatile Discs: Lousy Name, Nifty Technology



Thinking about buying a 6X or 8X CD-ROM drive? Or maybe a library of grainy MPEG-1 CD videos and specialized hardware to play 'em? Save your money for something guaranteed to wipe them off the face of the map: DVD.

DVD originally stood for *digital video disc.* But marketers eventually woke up to the idea that the product, which is capable of video that's better than VHS, excellent sound, and data storage on a grand scale, might do as much for keyboard jockeys as for couch potatoes, so the *V* now officially stands for *versatile.* Indeed, DVD promises to put digital video on your TV and in your computer within a year. This is not mere pie in the sky: Impressive prototypes were demonstrated at major trade shows last November and in January.

Early last year, two warring standards threatened to divide the industry the way Beta and VHS did with videocassettes. But DVD, the peace-treaty offspring, is now likely to do for video what CD audio did for music, giving it digital quality and extracting higher profits. But whereas CDs took a long time to reach PCs, this time the computer and consumer products should arrive more or less together—though the computer stuff will be pricier.

The physical discs resemble CDs, only thinner, so DVD players can also read current CDs and CD-ROMs (obviously, current CD-ROM players won't read the new DVD discs). But each DVD can hold at least 4.7 gigabytes on a single side, or about 7 times what a CD-ROM holds now. And that's just for a single-layer disc. Some DVDs will be double-layer discs, capable of holding 8.5GB. Either type can be bonded back-to-back to create a two-sided disc with up to 17GB of data.

Transfer rate? Up to 1.35 megabytes per second, the equivalent of a 9X CD player. A single-sided, single-layer disc using MPEG-2 compression can hold a 133-minute feature film, complete with three sets of surround-sound tracks and four sets of subtitles. And all this is supposed to be available by late this year.

Gentlewomen and gentlemen, start your cerebra. Just imagine—"full-screen, full-motion video" no longer has to mean a screenful of jerkily moving blocks. "Realism" in games need no longer describe scenery reminiscent of Legoland. Five-disc sets with maddening swaps will disappear. (At least for a while: An unshakable rule of computerdom dictates that "big enough" never is.)

There's more. Eventually the DVD consortium hopes to give us single-layered write-once discs holding 3.8GB per side and rewritable versions holding 2.6GB per side—not bad for backups or as the sole removable medium for handheld devices.

A Joker in the Deck

The main joker in the deck, at least for a while, is the same one that doomed the videodisc to second-class sales: Read-only players won't let you download programs from the airwaves. Writable models might be delayed as copyright holders work up schemes to foil the possibility of creating perfect duplicates of their precious content. And some ugly patent squabbles are in the works. Still, DVD is likely to work because the discs will cost less to duplicate and ship than videocassettes, take less shelf space, and deliver higher quality. To help grease the wheels, Hollywood will no doubt release many of its most popular titles first on DVD.

When it comes to computer DVDs (the official term is DVD-ROM), the usual compatibility questions will no doubt rear their ugly heads. DVD players will use IDE or SCSI interfaces, but will they also take advantage of new hardware like the Universal Serial Bus or Firewire? How soon will video cards routinely include MPEG-2 decoding hardware? Will you want to wait for drives that can record? And how long will it take until software—not just movies—turns up in DVD format?

When DVD arrives late this year, it will likely do for video what CD audio did for music, giving it digital quality and extracting higher profits.

But these problems are unlikely to be much worse than the ones we deal with already, like my CD-ROM drive's having to be fooled shamelessly into working with Win 95's Autoplay feature. And at least when we see video, we won't be trying to squeeze it out of a technology intended as audio-only.

The days of CD-ROM players and MPEG-1 are numbered. If you're buying a new PC, a cheap CD-ROM player will do for now. And eschew upgrades. If an MPEG-1 movie wants to play in my machine, it will have to be decompressed by software. And last year's 2X CD-ROM drive will stay in its bay until a DVD unit takes its place.

PC World *Contributing Editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).*

By Stephen Manes

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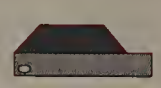
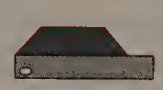
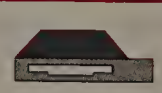

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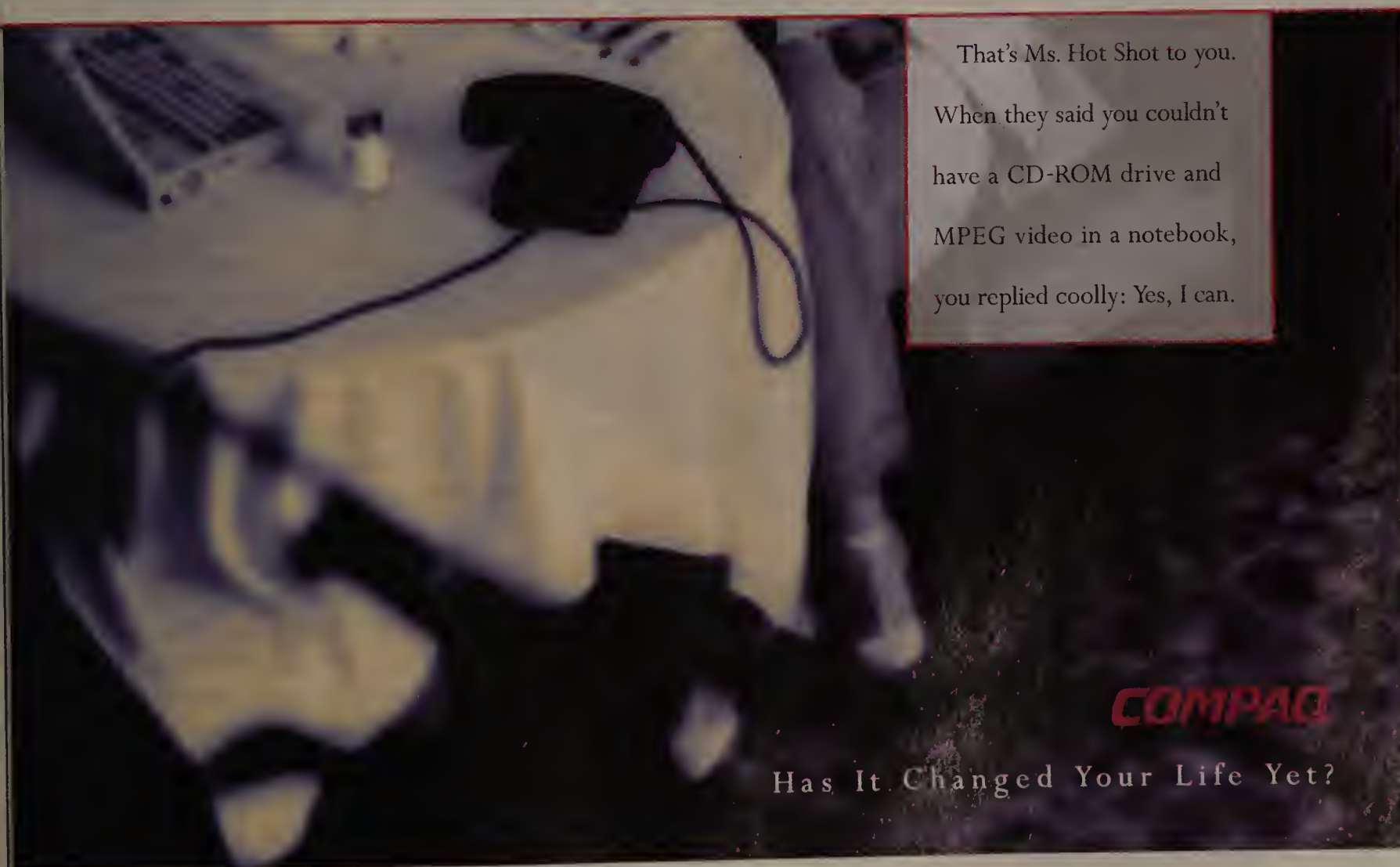


Circle 88 on reader service card

Pentium Notebooks

Fast, Bright, and Affordable

As recently as last year, notebook PCs were a bit like Ford Escorts: They got you where you needed to go, but what you really wanted was something like a Mercedes. Notebook owners resigned themselves to compromises—small screens, terrible trackballs, and cramped keyboards. Worse yet, they often faced the inconvenience of having to use one set of software applications at the office and a less demanding set on the road.

This year, you no longer have to carry around a hobbled version of your desktop PC. Makers of notebooks have decreed Pentium processors the standard CPU and 10.4-inch screens the minimum display size. High-end hardware technologies—the PCI bus, fast EDO RAM, gigabyte hard drives, quad-speed CD-ROM players, and ergonomic keyboards and pointers—have moved to notebooks. And many systems now use modular designs that let you swap components in and out. Thanks to aggressive prices, even budget buyers can now afford posh Pentium notebooks.

This shift marks an amazing improvement from only a year ago. High-end notebooks in *PC World*'s March 1995 Top 20 typically offered 486 DX4-100 processors, 10.4-inch dual-scan or active-matrix VGA

Edited by Andy Reinhardt and Randy Ross

Nearly the equal of today's office PCs, the newest portables are like desktop systems shrunk into tiny packages.

color screens, and 540MB hard drives, for around $4200. By comparison, Micron's new high-end Millennia TransPort P120 notebook delivers a 120-MHz Pentium chip, an 11.3-inch SVGA dual-scan screen, and an 810MB removable hard drive, for $200 less. Our March 1995 budget notebooks, averaging around $2300, used 9.5-inch screens, 340MB hard drives, and 486DX2-50 CPUs. Toshiba's new budget notebook costs under $2000 and sports a 75-MHz Pentium, a 10.4-inch dual-scan color screen, a 500MB hard drive, and fast EDO RAM.

A MODULAR SLOT holds a battery, CD-ROM drive, or floppy drive (above) in the Micron Millennia TransPort P120 (left).

It's about time, says Tom Lenzo, a training and development consultant in Pasadena, California, whose old Toshiba notebook is no longer a trusty companion. With a 286 processor, a 20MB hard drive, and a monochrome screen, the machine lets him run only an old DOS version of WordPerfect. Lenzo would like to be able to use the same software on the road that he runs on his office 486-66 desktop, but the high cost of achieving this parity has held him back.

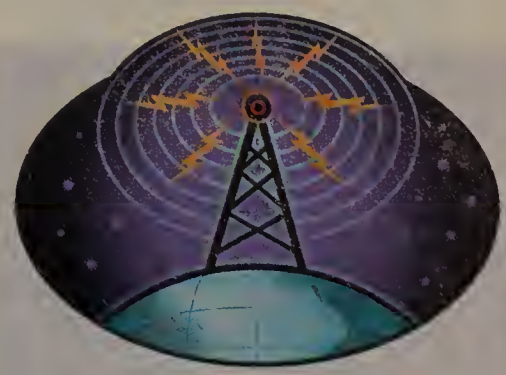
Now Lenzo can choose from a range of powerful portables at human-scale prices. Why? Because Intel continues to cut prices and raise speeds on Pentium chips, including new power-saving versions of the popular 120-MHz chip and a planned 133-MHz model. A price war among LCD makers is forcing screen costs down, which means more vendors will implement 11.3- and 12.1-inch displays this spring, says Randy Giusto, manager of mobile computing research for International Data Corporation. More notebook vendors will also introduce SVGA-resolution screens (800 by 600) later this spring, Giusto adds.

At the same time, improved software, such as the Briefcase utility bundled into Windows 95 and Traveling Software's new LapLink for Windows 95, makes it easier to synchronize work between your desktop and mobile systems. "It's a great time to buy a notebook," says Giusto.

Power Package

If you have a 75-, 90-, or 100-MHz Pentium PC on your desk, it will fairly crawl compared to Micron's Millennia TransPort. Thanks to 256K of pipeline-burst secondary cache, 16MB of EDO RAM, and a PCI bus video subsystem, a preproduction model of this Pentium-120 ran the new PC WorldBench tests faster than *any* other notebook we've measured—including 133-MHz models. The 11.3-inch dual-scan SVGA screen supports up to 800 by 600 resolution, and the system's full complement of multimedia capabilities includes 16-bit Sound Blaster audio, integrated speakers and microphone, and a quad-speed removable CD-ROM drive. Micron has incorporated TrackPoint and touchpad pointing devices; you can use either or both. The system weighs 8 pounds—a bit on the heavy side.

If you believe this notebook is only for engineers or lucky CEOs, think again: With a removable 810MB hard drive, it starts at $3999. Switching from the dual-



Breaking News

MICROSOFT'S SIMPLER PC: While headline-grabbing vendors trumpet proposals for $500 Internet appliances, Microsoft is quietly developing its own vision of a less expensive PC. At the Windows Hardware Engineering conference on April 1, Microsoft is expected to announce a project called the Simply Interactive PC. The goal is an affordable, easier-to-use home system with multimedia and communications features, says Jesse Berst, editorial director of the *Windows Watcher* newsletter. Microsoft will also discuss a future version of Windows, code-named Memphis, and preliminary specs for hardware and software vendors to use in developing products, Berst says. Among the areas Microsoft is expected to address are new multimedia and 3-D technologies, infrared keyboards, and easier Web browsing. The company is also developing software that could eliminate the need for dedicated PC devices such as sound cards. But don't hold your breath: Analysts say these products won't show up until at least 1997. Microsoft declined to comment on Memphis or the Simply Interactive PC at press time. —L. M.

WINDOWS CODE LEAKS: Some 30MB of prerelease Windows code escaped from a Microsoft development lab and has been circulating on the Internet without the company's consent. The AWOL code includes early versions of

(continued on page 47)

PHOTOS: JOHN GREENLEIGH; ILLUSTRATION: LEFT, NICK FAIN; ABOVE, JEFFREY PELO

scan display to an 11.3-inch active-matrix screen and a 1.3GB hard drive bumps the price up by only $500, to $4499. In March Micron also expects to introduce a 133-MHz version of this high-end model for $4899. All units include Microsoft Office Professional 95, Bookshelf 95, and the Windows 95 Plus Pack—a valuable bundle few other machines deliver.

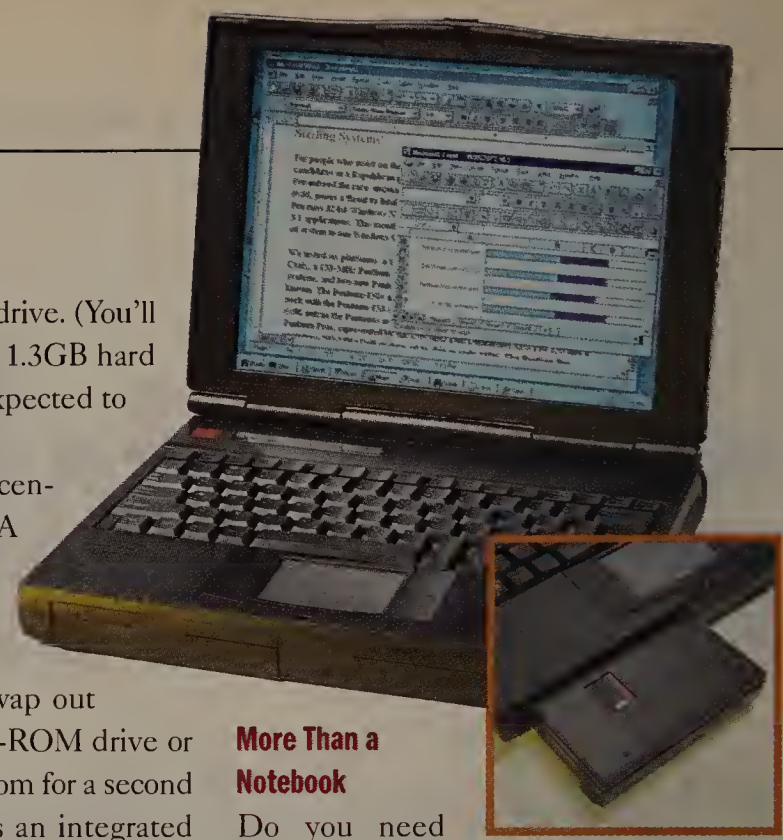
You can remove the Micron's CD-ROM drive or floppy drive as needed to reduce weight or accommodate a second lithium ion battery. Micron claims you'll get 3 to 4 hours of power with one battery, 6 to 8 hours with two; we weren't able to test battery life on this early system.

Modular Family

Joining the modular trend, the Ascentia P Series notebooks from AST Research offer parts that adjust to suit your needs. We examined a preproduction Pentium-100 Ascentia, which had specs similar to the Millennia's. It was fast enough to make many desktop PCs seem tired, and it outperformed a P-120 notebook from Texas Instruments. Street prices should run lower than Micron's, starting at $3599 for a 100-MHz Pentium model with 8MB of EDO RAM and an 800MB hard drive. (You'll pay $3999 for a unit with a 1.3GB hard drive.) In March, AST is expected to ship 133-MHz models.

The sleek, 6.8-pound Ascentia has an 11.3-inch SVGA dual-scan LCD that was quite sharp on the unit we tested. You can easily remove the hard drive or swap out either the quad-speed CD-ROM drive or the floppy drive to make room for a second battery. AST also includes an integrated 28.8-kbps fax-modem, an infrared port compliant with the IrDA (Infrared Data Association) standard, and two PC Card slots (one Type II and one Type III). On the downside, the keyboard feels a bit cramped, with keys that are about 10 percent smaller than full size.

AST doesn't skimp on multimedia. The Ascentia uses PCI local bus video with 1MB of DRAM, 16-bit Sound Blaster audio, and a built-in mike and speakers. It's also a long-distance champ: With a lithium ion battery, the notebook ran for 4.2 hours in our tests. AST says you'll get 8 to 12 hours with two batteries installed; a handy LED indicates the battery charge level.



AST'S ASCENTIA P-100 has the longest battery life of the new Pentium notebooks we tested.

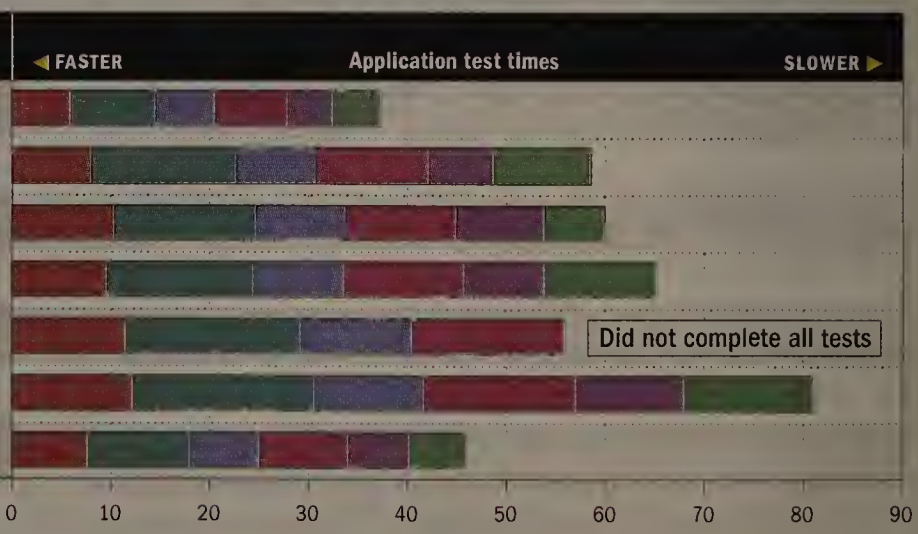
More Than a Notebook

Do you need more than just a desktop PC replacement? How about a portable office? Canon's NoteJet IIIcx, starting at about $5799, gives you a built-in Bubble Jet color printer. The print head also pops out to accommodate a scan head, giving you the first combination notebook/color printer/monochrome scanner. Canon's 90-MHz Pentium NoteJet IIIcx offers 8MB of RAM, a big 11.8-inch active-matrix SVGA display with 800 by 600 resolution, and an 810MB hard drive. A 120-MHz Pentium model with a 1.2GB hard drive costs $6999.

TEST REPORT

Nimble New Notebooks: Fast and Fancy

System	CPU	RAM (MB)	Secondary cache (K)
Micron Millennia TransPort	Pentium-120	16	256
AST Ascentia P Series	Pentium-100	8	256
Samsung Sens810	Pentium-75	24	0
Canon NoteJet IIIcx	Pentium-90	8	256
Toshiba Satellite 100CS	Pentium-75	8	0
Average of four P-75 notebooks[1]	Pentium-75	8	256
Average of two P-133 notebooks[2]	Pentium-133	16	256



32-bit Word 7.0 · 32-bit Excel 7.0 · 16-bit 1-2-3 release 5.0 for Windows · 16-bit Paradox 5.0 for Windows · 16-bit WordPerfect 6.1 for Windows · 32-bit Picture Publisher 6.0

[1]From Broadax, Compaq, MPC, and Texas Instruments.
[2]From Broadax and Eurocomm.

Methodology For a description of the new PC WorldBench test suite, see "Best PCs for Windows 95."

Data based on PC WorldBench testing conducted by the PC World Test Center. All rights reserved.

The NoteJet IIIcx's printer provides 720-by-360-dots-per-inch resolution for text and 360 by 360 dpi for color graphics. Text speed is rated at up to 3 pages per minute, color at 0.8 ppm. Just feed paper in under the keyboard, and it slides out from the back of the notebook. An optional automatic sheet feeder holds 10 sheets of letter- or legal-size paper. The system can also handle transparencies and envelopes.

By using the scanner head—a small cartridge that snaps easily into the notebook—you can scan documents at up to 360 dpi with 64 levels of gray. Add a third-party fax-modem, and you can fax hard-copy materials from the road.

The Canon notebook also provides an IrDA infrared port, a slot for one Type II or two Type III PC Cards, 16-bit Sound Blaster audio, built-in speakers and mike, and a TrackPoint II.

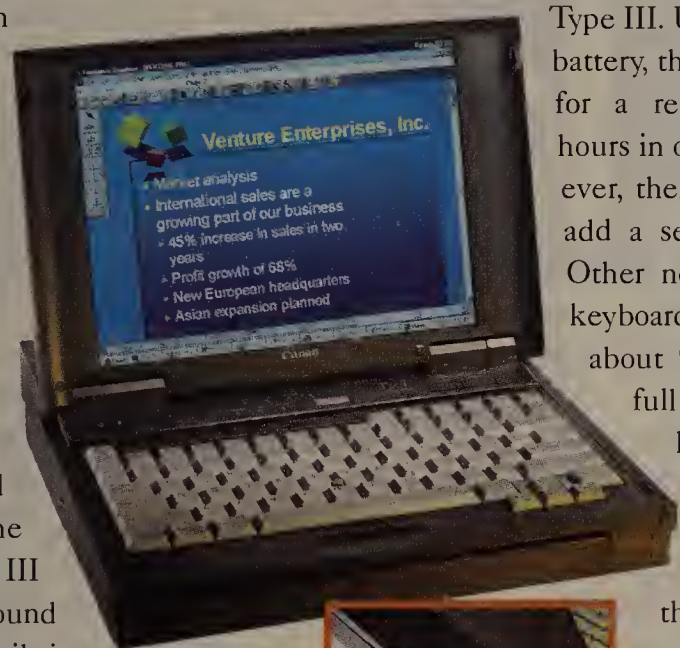
The notebook performed at the speed we'd expect from a 90-MHZ machine, but even with a NiMH battery, it ran for only about 2.5 hours in our tests. Another downside is size: It weighs 9.4 pounds and measures about 12 by 11 inches, versus the usual 9 by 11. It's also about 2.75 inches thick—half an inch more than today's average notebook. Still, the pros clearly outweigh the cons if you need to print or scan when you're on the road.

Better Budget Notebooks

Maybe you don't need a business center in your notebook. But even in this year's budget mobile systems, you could find more power than you have on your desktop.

Expected to sell for $1999, Toshiba's Satellite 100CS has a 75-MHz Pentium processor, 8MB of EDO RAM, and a 10.4-inch dual-scan display. Not too shabby for under $2K. Thanks in part to fast RAM, the Satellite's performance in *PC World* tests is comparable to that of other P-75 notebooks, even though it lacks secondary cache. (Unfortunately, we couldn't get the machine to complete our full test suite.) We liked the display on the preproduction unit we saw, though it wasn't as crisp as the Micron's or the AST's. The 500MB hard drive isn't huge, but it's ample.

The 6.9-pound notebook includes a floppy drive and an AccuPoint pointing device, and accepts two Type II PC Cards or one Type III. Using a NiMH battery, the Satellite ran for a respectable 3.6 hours in our tests; however, there's no way to add a second battery. Other negatives: The keyboard is a bit small, about 90 percent of full size, and the hard drive is not removable. Still, considering this notebook's price, it's hard to fault it for these minor flaws.



MOBILE BUSINESS CENTER: The Canon NoteJet IIIcx has a built-in printer and scanner.

Samsung has not been known for cutting-edge notebooks, but its newest models are not yesteryear's econoboxes. Samsung has adopted some of the innovations that make IBM ThinkPads so popular, such as great sound and modular parts. There's one big difference, however: Samsung's prices start at under $2800.

The 75-MHz Pentium Sens810 unit with 8MB of EDO RAM, an 810MB removable hard drive, an 11.3-inch SVGA dual-scan screen, and a quad-speed removable CD-ROM drive costs just $2799. The system has PCI bus video, IrDA capability, and two PC Card Type II slots. You can switch to a 100-MHz chip and an active-matrix

Breaking News

(continued from page 45)

a personal information manager and a new Internet browser. Some analysts believed these were part of a planned 1996 update to Windows 95, or perhaps even of the operating system's next release, which has been referred to previously by the code name Nashville. But Mike Ahern, the Windows 95 product manager for Microsoft, explains otherwise: "There will be no point release for Windows 95 in 1996," he says, using industry terminology for software updates with decimal numbers. Nor, he says, is Nashville necessarily a planned successor to Windows 95; rather, the name now refers only to various works in progress. The rogue code "is a collection of technologies that may or may not appear in future products," Ahern asserts. —R. R.

MORE HARD TIMES FOR SOFTRAM95: Bad news keeps piling up for Syncronys Softcorp, maker of the controversial SoftRAM95 memory doubler. After torrents of bad press, an inquiry by the Federal Trade Commission into reports of consumer fraud, and a "cease and desist" letter from Microsoft, Syncronys has recalled SoftRAM95 from retail shelves. Microsoft charges that Syncronys used beta code from the Microsoft Developer Kit in SoftRAM95 without permission, and then used the "Designed for Windows 95" logo without meeting Micro-

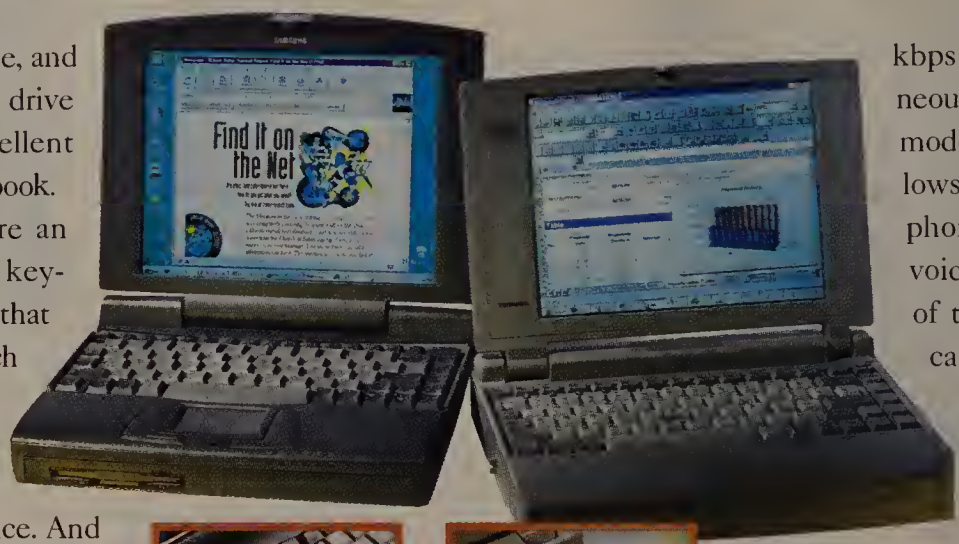
(continued on page 49)

PHOTOS: JOHN GREENLEIGH; ILLUSTRATION: TOP, JEFFREY PELO; BOTTOM, GORDON STUDER

LCD, add 256K of secondary cache, and bump the RAM to 16MB and the drive to 1.3GB for only $3499—an excellent price for such a well-stocked notebook.

Samsung's new systems feature an unusually well built ergonomic keyboard, which splits into two parts that swing out about half an inch on each side. We found it very comfortable, with full-size keys and an oversize spacebar. A touchpad proves a convenient pointing device. And it's easy to swap out the CD-ROM drive to accommodate a battery pack or TV tuner.

We tested a preproduction 75-MHz unit with 24MB of RAM and an active-matrix SVGA display. (Samsung couldn't provide 8MB or 16MB units in time for testing; the model we evaluated would cost $4299.) Scores for the 7.7-pound machine were far better than our P-75 notebook average, and we expect secondary cache in active-matrix models to boost performance even further.



WRIST AID: The keyboard swings out on the ergonomic Samsung Sens810.

NO BULKY ADAPTER: Toshiba's Satellite 100CS uses only a thin AC power cord.

In battery testing, the Samsung notebook ran for 2.75 hours off lithium ion batteries. Samsung says you'll get up to 10 hours with a second battery.

The unit's 16-bit sound and powerful speakers produce audio markedly better than the sound from most notebooks. And for $300 extra, you can add a 28.8/14.4-kbps DSVD (Digital Simultaneous Voice Data) cellular fax-modem, plus software that allows full-duplex speakerphone conversations and voice mail. If you want some of these fancy features and can't afford a ThinkPad, think Samsung.

If you have your heart set on a ThinkPad, IBM is set to introduce new lower-cost options called the ThinkPad 760L and 760LD. These units, which weren't available for testing in time for this article, start at about $4100 for a 90-MHz Pentium, 8MB of RAM, a 10.4-inch dual-scan display, and an 810MB hard drive. But the AST, Micron, and Samsung units still offer more for the money.

In fact, this whole new crop of notebooks exemplifies two welcome trends in notebooks: IBM is no longer the only vendor able to dream up novel designs, and innovations are no longer limited to the high end. If living in two worlds has got you stressed, take comfort: Your next notebook, even if it's a budget model, will be able to run the same software as your desktop PC.

—Laurianne McLaughlin

AST Ascentia P Series

AST Research, 800/876-4278
Pricing: from $3599
Reader service no. 773

Canon NoteJet IIIcx

Canon Computer Systems, 800/848-4123
Pricing: from $5799
Reader service no. 774

Micron Millennia TransPort P120

Micron, 800/223-6571
Pricing: from $3999
Reader service no. 775

Samsung Sens810

Samsung Electronics, 800/933-4110
Pricing: from $2799
Reader service no. 776

Toshiba Satellite 100CS

Toshiba America, 800/999-4273
Pricing: from $1999
Reader service no. 777

What a Difference a Year Makes

		Typical March 1995 Top 20 notebooks	Latest notebooks
POWER SYSTEMS	Processor	DX4-75 to DX4-100	90-MHz to 120-MHz Pentium
	RAM	8MB	8MB or 16MB
	Hard drive	340MB to 540MB	810MB to 1.3GB
	Screen	dual-scan or active-matrix color, 9.4 to 10.4 inches, 640 by 480 resolution	dual-scan or active-matrix color, 11.3 to 11.8 inches, 800 by 600 resolution
	Pointing device	trackball	touchpad and/or TrackPoint
	CD-ROM drive	none	4X removable
	Price	$2999 to $5429	$3599 to $6999
BUDGET SYSTEMS	Processor	486SX-33 to DX4-100	75-MHz Pentium
	RAM	4MB to 8MB	8MB
	Hard drive	125MB to 340MB	500MB to 810MB
	Screen	monochrome, passive or dual-scan color; 7.8 to 10.3 inches, 640 by 480 resolution	dual-scan color, 10.4 to 11.3 inches, 640 by 480 resolution
	Pointing device	trackball	touchpad or AccuPoint
	CD-ROM drive	none	some with 4X removable
	Price	$1549 to $2689	$1999 to $2799

Source: PC World March 1995 and notebook vendors

PHOTOS: JOHN GREENLEIGH

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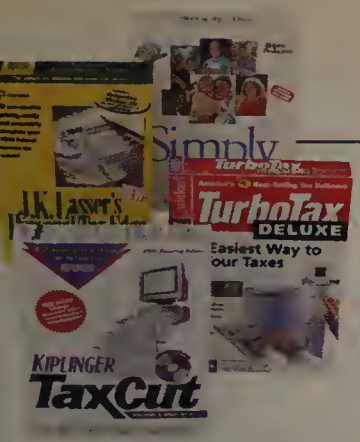
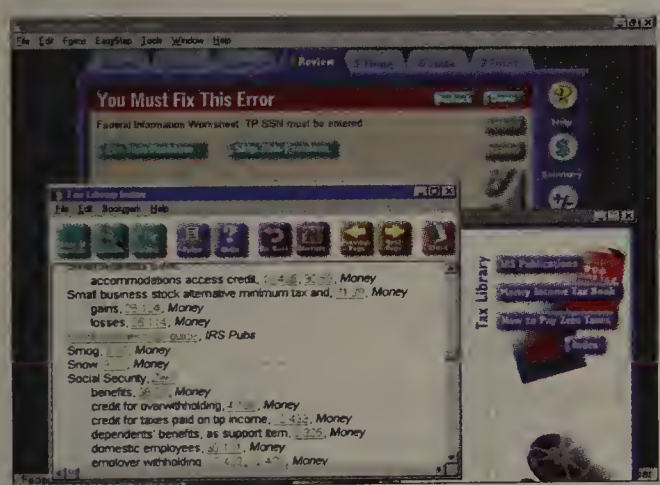


Navigating the Tax Maze

Given last year's tax software debacle, when Intuit and others loosed bug-infested programs upon the public, you may be wondering if tax preparation software even makes sense. The answer is yes. Tax software helps ensure the mathematical accuracy of your return and can perform diagnostic routines to spot errors and alert you to missing information. And this year the leading products offer more forms and built-in advice.

I received "head start" versions of the four top packages in this category—Kiplinger TaxCut from Block Financial (800/457-9525), Personal Tax Edge from Parsons Technology (800/223-6925), Simply Tax from Computer Associates' 4Home Productions (800/773-5445), and TurboTax from Intuit (800/964-1040). These early-bird releases let you get a jump on filing your taxes, but they don't include the IRS's final forms, which are sent automatically to registered users of the head start versions—and included in late retail copies.



AN EASY-TO-USE INTERVIEW in Intuit's TurboTax Deluxe leads you through filing your tax return.

Whichever one you choose, your investment won't break the bank and could save you the cost of your outlay many times over. TurboTax and TaxCut street prices are less than $40; Simply Tax and Personal Tax Edge list for under $20 each. Add-on programs for doing state taxes cost extra, and it'll cost you $15 to file electronically.

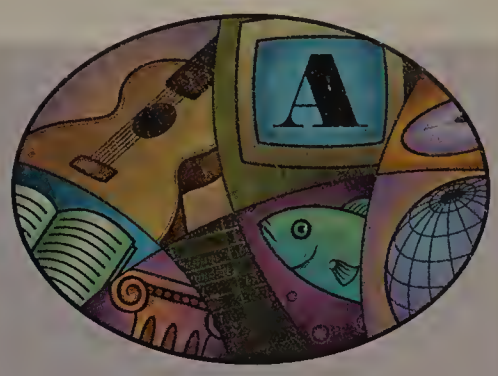
All these programs calculate and print returns designed to satisfy the IRS. However, I found TurboTax, with its easy-to-use interface and top-notch tax preparation capabilities, the best product overall. An extra $10 gets you the deluxe version on CD-ROM, which comes packed with tax references, such as electronic versions of *The Money Income Tax Handbook* and *How to Pay Zero Taxes*, and 100 or so video clips of tax tips. The final version of TurboTax will also include a custom copy of Netscape Navigator to give you direct access to the TurboTax Web page, which supplies a trove of programs and tax tips. (Intuit also sells a $70 TurboTax for Business package.)

TaxCut is nearly as skillful as TurboTax and is similarly friendly (its interface bears a striking resemblance to TurboTax's). The CD-ROM version includes video tax tips and advice from Kiplinger editors. If you have a home office, you'll appreciate the way TaxCut allocates personal and business expenses so you won't risk duplicating deductions. State tax forms are available for 23 states, compared with 45 for TurboTax.

Personal Tax Edge and Simply Tax don't have the multimedia bells and whistles of the more expensive offerings, but they're competent packages. Simply Tax has a more streamlined look than before and more forms, schedules, and worksheets—120 in all. It includes tax advice written by a CPA but would benefit from a multimedia help system.

Personal Tax Edge takes the no-frills approach. Its 80 IRS forms and schedules cover most common tax situations, and it includes advice from expert J. K. Lasser. You can contrast results for filing jointly or separately and compare your return to U.S. averages. But if you have complex finances, Tax Edge may not meet all your needs.

—Richard Morochove



Breaking News

(continued from page 47)

soft's standards or obtaining a license. Moreover, tests in our own lab (see *Top of the News*, January) revealed that under Win 95, SoftRAM95 did not boost memory levels and actually slowed performance, contrary to Syncronys's claims. —G. M.

INDECENT PROPOSAL: While conservative leaders are trying to force an online censorship bill through Congress, the PC industry is working on an alternative. The Platform for Internet Content Selection, or PICS, is a voluntary program much like today's movie-rating system, under which online providers would label their sites so parents could allow a child access only to certain areas. Organized by MIT's World Wide Web Consortium, PICS has the backing of more than 35 partners, including America Online, CompuServe, and Prodigy. A draft proposal is available at http://www.w3.org/pub/WWW/PICS/. The group aims to complete the proposal by March. How soon labeling can be implemented depends on vendor acceptance. —L. M.

COPYRIGHT CONCLUSION: The long legal joust between Borland and Lotus is finally over. The U.S. Supreme Court let stand a lower court ruling that Quattro Pro did not violate 1-2-3 copyrights. The decision leaves unresolved questions concerning copyright protection for software interfaces. —A. R.

Edited by Randy Ross

ILLUSTRATION: JEFFREY PELO

PerfectOffice for Win 95 Moves Ahead

TEST DRIVE

Choosing software on the basis of features and price is far from a hard science. But the process gets downright metaphysical when a product's future is in question. Take the new PerfectOffice 7 for Windows 95. At press time, its owner, Novell, was looking to sell the whole suite to another company.

The divestiture isn't a reflection of the suite's caliber. After examining the first prerelease version of PerfectOffice 7, Standard Edition, we were impressed with the direction the package is taking—even though many key features were not yet up and running. True, it lacks Lotus SmartSuite 96's workgroup tools and an equivalent to Microsoft Office's Binder, but PerfectOffice will probably have the best Internet tools. And the core applications, particularly WordPerfect, look much improved.

In addition to WordPerfect, the standard edition of PerfectOffice contains the Quattro Pro spreadsheet, the Presentations graphics/slide-show package, the InfoCentral personal information manager, and the Envoy electronic publishing tool. (The professional edition adds the GroupWise groupware package, which Novell is not selling off, and the Paradox database manager, licensed from Borland.)

Novell was expected to announce a buyer for PerfectOffice by the end of January. The pending sale raises a number of questions for anyone contemplating an upgrade, says Jeff Silverstein, editor and publisher of *Software Industry Bulletin*. Will the new owner continue to enhance the product and provide the same high level of technical support that WordPerfect users expect? How much will the suite cost you?

Given all this uncertainty, should you play it safe and opt for another suite? Not necessarily. Early indications suggest that PerfectOffice won't be orphaned. Novell has been careful to obtain guarantees of support and ongoing development for the product, says Jeff Tarter, publisher of *Softletter*. "[Novell] doesn't want to just send it off to the chop shop."

Novell is spinning off PerfectOffice, but don't dis this suite: The new Win 95 version looks promising.

Moreover, the new owner will have a strong incentive to nurture the product. WordPerfect has a customer base of more than 20 million, according to Novell. If the new company can convince some of these users to upgrade to the PerfectOffice suite, it will have a hefty revenue stream, Tarter says.

Novell expects PerfectOffice to ship in April, although this date has slipped several times in the past and could slip again, depending on the new owner's inclinations.

Apps With a Lot in Common

To woo its large base of WordPerfect users, Novell is calling PerfectOffice the "smart WordPerfect upgrade." To this end, it designed the interfaces of all the suite's applications to look and feel like WordPerfect. Judging from the beta, this effort was successful: The toolbars, menus, dialog boxes, and right mouse button commands in each app resemble those in WordPerfect. This consistency should make it easier to learn and use unfamiliar programs in the suite.

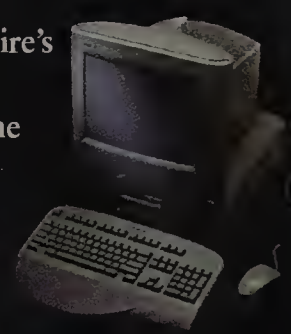
Unlike the programs in SmartSuite96, PerfectOffice apps are all 32-bit code, which means you'll be able to use long file names and enjoy Windows 95's greater stability. The programs also share more code than did their previous counterparts, which should make the suite smaller and faster. (We could not verify this claim on the prerelease version). For instance, the spelling checker, thesaurus, and Grammatik grammar checker are all shared components. WordPerfect, Quattro Pro, and Presentations also share QuickCorrect—an on-the-fly typo-correcting tool—and the PerfectScript cross-application scripting language.

For easy integration, PerfectOffice features the Desktop Application Director—a floating, customizable toolbar from which you can launch apps faster than with Windows 95's Start menu. One invaluable DAD feature lets you use a mouse click to

GORDON STUDER

I'm rebuilding City Hall using the tools in my kitchen.

Rome wasn't built in a day. But my clients think a building can be. Luckily, my new Acer® Aspire™ helps me do the impossible. If I need to be across town at a planning meeting, Aspire's integrated speakerphone puts me right in the boardroom. But, I can still be at my desk at home, working on a materials budget at the same time.



In fact, Aspire is loaded with features that help me get things done. Like the full color, CD-ROM multimedia presentation that wowed the City Council, and got me into this mess in the first place. Acer must understand I'm busy, because they simplified setup and preloaded all the software. I didn't have much more than the five minutes it took to get Aspire up and running. But now I've got all the time in the world to build my career from the ground up.

A few more things I can do with my Aspire:

Do environmental studies.

Negotiate the best prices.

Keep up with architectural news.

Search for interior designers.

And cruise around the Internet.

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Circle 102 on reader service card

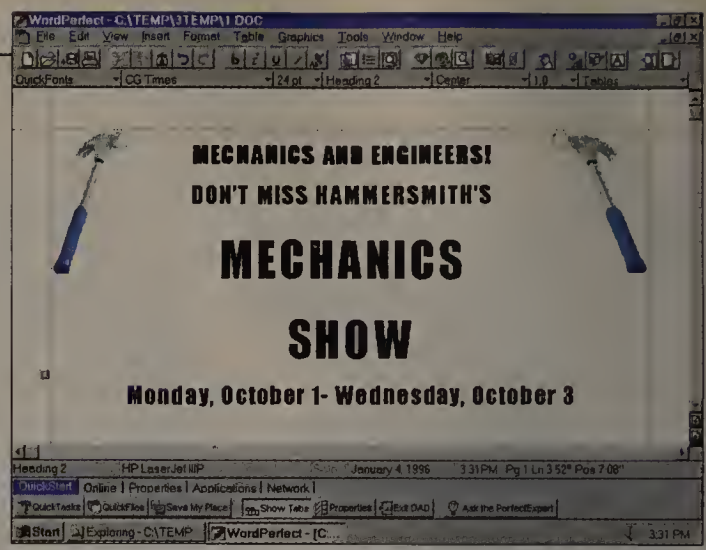
save your place in several open documents, whether they're spreadsheets, presentations, or word processing files. Next time you restart your PC, you'll return to all your previously opened apps exactly where you left them. You won't find this convenience in DAD's predecessor or in Microsoft Office or Lotus SmartSuite.

On the downside, the early beta we saw lacked a compound-document feature like Microsoft Office's Binder, which provides a handy way to assemble related files from disparate applications into a single file.

Like its competitors, PerfectOffice now has a natural-language help system, called PerfectExpert. Available from any app or from DAD, it lets you type questions in plain English. Although helpful, it's far from perfect. When I asked, 'How can I create a home page?' PerfectExpert drew a blank, even though the answer is available through the regular help system.

The PerfectScript language should suit a wide range of users, from novices to in-house developers. Its new macro-recording feature, unique among the three major suites, lets you create macros within and *across* applications without having to know any programming commands. More-advanced users can perform functions such as building custom dialog boxes.

PerfectOffice can't match SmartSuite's workgroup features, but it supports Notes F/X 2.0, a technology for exchanging data between applications and Notes databases. The Workflow feature, available from the file menu of each PerfectOffice app, lets you route e-mail documents sequentially or in a broadcast fashion.



THIN BLUE GUIDELINES let you easily change margins, columns, and tabs. Small buttons next to paragraphs provide quick access to other formatting options.

Cool Tools for the Internet

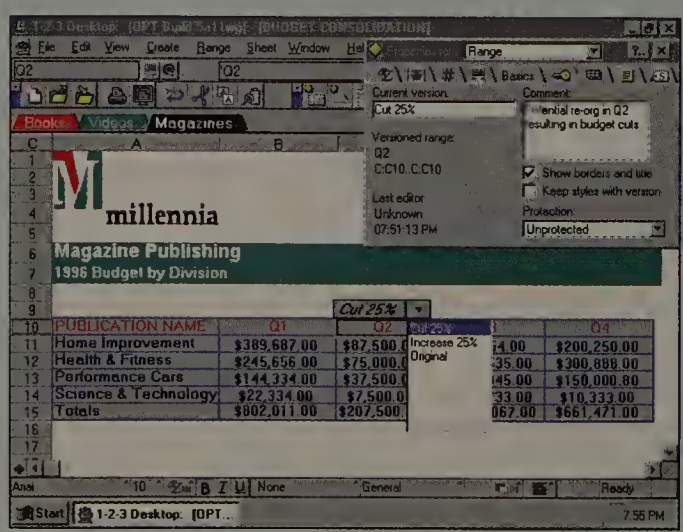
Novell plans to add tools for Internet enthusiasts. These weren't enabled in the beta we looked at, but if all the expected features are implemented, PerfectOffice will have more Internet savvy than either Microsoft Office or Lotus SmartSuite. Here's a look at what's coming.

When the product ships, Novell will bundle Netscape Navigator 2.0, the latest version of the market-leading World Wide Web browser. You'll be able to access Netscape via the toolbar from within each of the main apps. You'll also be able to access Novell's Web site or CompuServe forums simply by pulling down the help

First Look at 1-2-3 for Win 95:

A software suite is only as good as its parts. On this basis, the current release of Lotus SmartSuite 96 is less than perfect because it includes an old 16-bit version of the flagship 1-2-3 spreadsheet. But the Windows 95 version of 1-2-3 is on the way. We saw an early beta, which offers something for the novice spreadsheeter, the DOS-version veteran, the networked executive, and the developer. The release had been expected to ship early this year, but Lotus now promises only that it will ship sometime in 1996. Here's a snapshot of the new version's most significant new features.

The top-level menu in the new 1-2-3 resembles the one in the current Windows 3.1 version, but it also incorporates changes that make it look like the Win 95 versions of other SmartSuite apps. In a similar vein, 1-2-3 will provide an InfoBox like the one in other Suite products. This dialog box floats in front of the worksheet and applies requested styles without requiring you to click OK. Lotus is finally adding another important feature, outlining—available in Microsoft's Excel since Excel 3.0 appeared in 1991.



1-2-3 FOR WINDOWS 95's SmartSuite InfoBox will make it easier to create and manage spreadsheet versions.

E-mail jockeys will appreciate improvements to the range-routing feature, which has been beefed up for Windows 95 and rechristened Team Mail. You can still send a file, or a range from an open worksheet, to one or more associates via e-mail, but now you can name, save, and reuse a mailing route instead of having to supply the names of coworkers every time you send data.

For serious developers, 1-2-3 for Windows 95 will continue to support the existing 1-2-3 macro language and will offer the LotusScript language as well. Keeping the macro language makes sense, because macros handle hundreds of tasks very well, and thousands of developers can practically write macro code in their sleep. On the other hand, LotusScript will accommodate operations that macros could never perform. Plus, you can make a script routine respond to a variety of spreadsheet events, such as the user changing the contents of a cell or the width of a column.

The Windows 95 version of 1-2-3 will be provided free to owners of the first release of SmartSuite 96; retail price is not set. Lotus Development, 800/343-5414. Reader service no. 710

—Richard Cranford

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menu in any PerfectOffice app, then clicking the appropriate command to fire up your modem and connect.

To help you create Web pages from within WordPerfect, PerfectOffice will include Internet Publisher, a product previously available as a free download. It lets you create a home page without having to learn the HTML programming language. To use Internet Publisher, you simply format a document using WordPerfect's character and paragraph styles, then export it. Internet Publisher kicks in, translates the formatting into HTML codes, and loads Navigator—which lets you see your page as millions of Web users could see it. Novell also will include AT&T WorldNet, a dial-up Internet package with all the tools you need to set up an Internet account.

Quattro Pro will let you create links to data on the Internet from within a worksheet for, say, updating stock prices. It will also let you quickly convert a worksheet into HTML's table format for publishing on a Web page.

Presentations, too, will have a slick new Internet feature: You'll be able to create a slide show that links directly to the Web. This capability will be useful for updating slides containing real-time information that changes frequently, like company earnings.

PerfectOffice's competitors, of course, are also diving into these waters. In the first quarter of 1996, Microsoft will offer a free HTML translator for Excel, as it has in the past for Word. And Lotus is currently bundling Web-browsing and HTML-translation capabilities into SmartSuite. But Novell's Internet strategy is more forward thinking. By integrating Internet connectivity from the get-go, and by offering the only suite to include Netscape Navigator, Novell will give users seamless access to all the Internet.

Near-Perfect Word Processing

Of all the applications in PerfectOffice, WordPerfect sports the most improvements and unique new features, all of which worked flawlessly in the beta we looked at. *Hotspots*, which Novell or its successor will rename in the shipping product, are small buttons that automatically appear next to paragraphs, graphical boxes, tables, and columns as you work.

Bug Watch New Flaws and Patches for Windows 95, Quicken, CleanSweep

More Windows 95 Security Flaws

▶ **Bugs:** Microsoft has acknowledged two new Windows 95 security leaks (others were reported in January's *Bug Watch*). Windows 95 stores passwords to shared network resources in a file; although this file is encrypted, determined snoops can break the scheme quickly. Source code for a decrypting program was posted on the Internet in early December. Separately, Microsoft says that documents created with either 16- or 32-bit versions of Excel, Word, and PowerPoint under Windows 95 may contain sections of previously deleted files. The OLE subsystem is at fault.

▶ **Fixes:** Microsoft has released patches for both problems—**mspwlupd.exe** bolsters Win 95's encryption scheme, and **ole32upd.exe** prevents OLE from tacking onto your documents text you thought was deleted. You'll find both files on Microsoft's Software Updates Web page (**http://www.microsoft.com/windows/software/updates.htm**) and in the pending Win 95 service pack.

Non–Intuit-ive Behavior

▶ **Bugs:** Intuit admits to numerous bugs in the 5.0 and 5.0c versions of its Quicken for Windows products. Problems include sluggish performance under Windows 95, Windows NT, and OS/2; transactions that appear to be missing when you use the Validate feature; lost transactions with the Subcategory Merge feature; and poor error handling during online banking transactions.

▶ **Fixes:** Intuit has released 5.0e patches for Quicken (**qw50e.exe**); for the Quicken Deluxe 5.0 floppy (**dlx50e.exe**); and for the Quicken Deluxe and Quicken Financial Suite CD-ROM (**cd50e.exe**). To find out which version you currently have, select *Help • About Quicken*. You can download the patches from Intuit's Web site (**http://www2.qfn.com/quicken/technical-support/quicken/releases/qfw5-releases/**), or from CompuServe (go **quicken**) or America Online (keyword **intuit**). If you've lost transactions due to a bug, Intuit technical support can walk you through the process of restoring your data from the program's backup file.

Intuit technical support: Quicken for Windows 505/896-7219; Quicken for Windows Deluxe—floppy version 505/896-7220, CD-ROM version 505/896-7221.

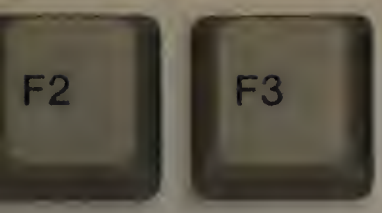
Not-So-CleanSweep

▶ **Bugs:** The initial release of Quarterdeck's CleanSweep 95 uninstaller program crashes the system when its Usage Monitor feature runs concurrently with Windows 95's ScanDisk or Defrag utilities or with Norton Speedisk. (Other utilities may also cause trouble.) There are additional problems, too: Accessing the program's Options • Configure dialog box causes a DDE Shell error; adding a Custom File Type strips the period from all files of that type (for example, system.dat becomes systemdat); and finding unused files by type fails with file names longer than 128 characters.

▶ **Fixes:** Quarterdeck has released a patch that fixes all these errors and improves file-deletion safeguards. You can find the patch file in the self-extracting archive **clnpat2.exe** on the company's Web page (**http://www.qdeck.com/qdeck/support/techlist.html**), ftp server (**ftp.qdeck.com/pub/clnsweep/**), BBS (310/309-3227), and CompuServe forum (go **quarterdeck**). **—Scott Spanbauer**

Found a hardware or software bug? Call us at 415/978-3253, or post your report on PC World Online. We'll try to dig up a fix.

TOP: GORDON STUDER; BOTTOM: JEFFREY PELO



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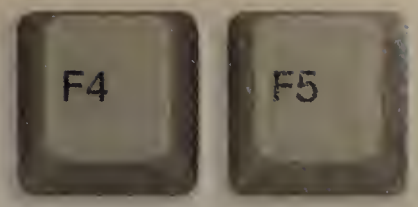
Free Software!



Scan OCR

"Presto! works scanner magic" – PC Week

Scan It!
Click once to scan and store photos or paperwork

Send It!
Just drag and drop to print, copy, or edit what you scanned

Store It!
Save what you're working on in an electronic file cabinet with text search tools

It scans, it copies, it files, it faxes...

Presto!™

Mail It!
Once you scan, you can send your image over electronic mail without leaving Presto!

Fax It!
With Presto!, you don't need a stand-alone fax machine. Just scan your pages straight to your fax modem.

See It!
Survey all of your files at once in a collapsible outline

Sort It!
Scanned text goes straight to a word processor, scanned photos go straight to a built-in image editor

Think your scanner can't learn new tricks? Then call today for your free copy of **Presto!**, the program that's sweeping the Windows world. **Presto!** adds one-button copying, one-button faxing, one-button image editing, and one-button OCR to any Twain-based scanner. It gives you all of the tools you need to manage photos and paperwork, and for the first 100,000 callers, it's FREE! ($9.95 S&H)

Presto! does it all: it scans an image at the touch of a button, and saves that image for you to work on later. It reads text off a page, without stumbling over every other word. It shares what it scans with other software programs. It even makes copies and sends faxes, without making you jump through hoops.

With Presto!, you get advanced technology like "voting" OCR (for more accurate text scanning), JPEG and CCITT compression (to save disk space), and a searchable, drag & drop filing system. Call today for your FREE copy of Presto!

Call today for your FREE software...

800/436-4360

OR DOWNLOAD PRESTO! TODAY:

http://www.tophat.com

$9.95 S&H charge is non-refundable. $19.95 S&H in Canada. Please have your Visa, Mastercard, or AmEx ready when you call. One copy per household. Offer good only in the U.S. & Canada. © 1996 Newsoft. Presto! is a trademark of Newsoft. All rights reserved. Offer subject to change without notice.

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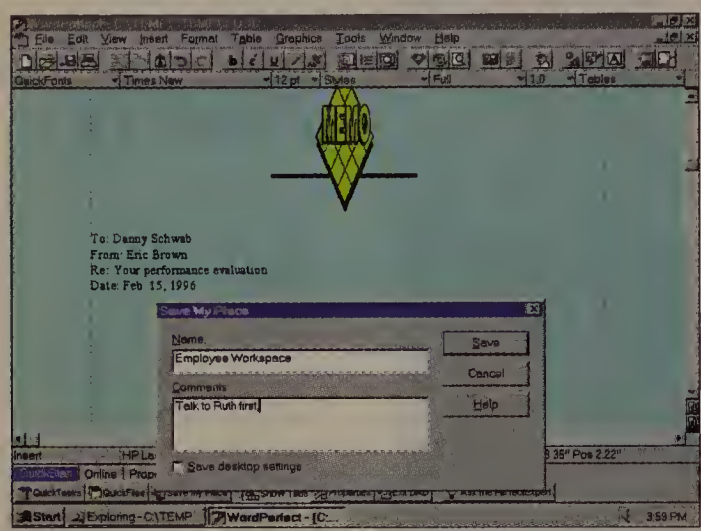
Click one, and you have quick access to formatting options associated with that part of your document—more options than you get by clicking the right mouse button.

WordPerfect has long been a graphically rich word processor. It now incorporates Guidelines, a desktop publishing–like feature. Just drag one of the thin blue lines that appear on screen, and you can change a margin, column, or tab. You can now rotate text within a table. And using the new Quick Art image previewer (accessible from each of the apps), you can view a graphic before inserting it into a document. Formerly this preview capability was available only in heavy-duty graphics programs such as Adobe Photoshop.



A PLACE-SAVING FEATURE in PerfectOffice lets you return to documents and pick up where you left off.

Other improvements match those found in Word 95 and Word Pro 96. Spell-As-You-Go highlights misspellings as you type. To fix them on the spot, you click the right mouse button on the word in question. You can automate even further by using the improved QuickCorrect, which now instantly corrects misspellings that it recognizes and changes the case of a word if you accidentally hit <Caps Lock> (if you type *tHIS*, QuickCorrect gives you *This*). Format-As-You-Go makes instant typographical improvements, such as changing asterisks into bullets and typewriter-style fractions (1/2) into typesetting-style equivalents (½).

The improvements in PerfectOffice's other applications are incremental but noteworthy. Quattro Pro, for example, now lets you graph data geographically, so you can display sales figures by state or create maps using colors or patterns to distinguish regions from one another and symbols to mark points. Quattro Pro now can import JPEG and WPG graphics as well.

Presentations' new organizational charting features let you manipulate text and boxes directly. And it has more than 40 new transition effects.

Adding It All Up

The early beta of PerfectOffice is promising, but questions remain. Will it outperform its predecessor and rival suites? How well can the new owner support it, and where will future development take the suite?

For now, we can conclude that PerfectOffice 7 is well worth considering for WordPerfect diehards who could use the suite's other strong apps, and for current PerfectOffice owners. Current users of Microsoft Office and Lotus SmartSuite probably have little incentive to switch. But in any event, the new owner of PerfectOffice is very unlikely to leave users in the lurch.

—Reid Goldsborough

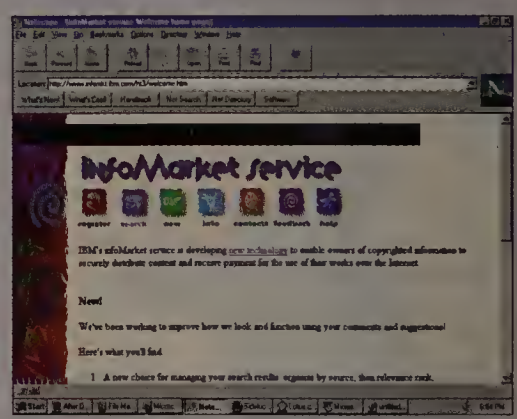
For late-breaking updates on the fate of PerfectOffice, check PC World Online.

PerfectOffice 7 for Windows 95

Key Features: All apps look and feel like WordPerfect • Most promising Internet tools • Best suite command center • More shared components for smaller code • Flexible scripting language
Pricing: To be determined
Availability: April (projected)
Novell Applications Group, 800/451-5151
Reader service no. 711

The Web Browser Humongous New Search Tools

Only two months ago *PC World* told you about the state of the art in Internet and Web search engines, but cyberspace just won't hold still. Take the new Inktomi from the University of California at Berkeley: This Web-crawling spider claims knowledge of more than 2.8 million Web documents, almost twice the amount of data on the most crowded site listed in our January roundup. http://inktomi.berkeley.edu/...If all you want is everything and you have the time to sort through it, try Alta Vista, the monstrous new search engine from Digital Equipment. It's huge and fast and extends an exorbitant promise: "You have access to all 8 billion words found in over 16 million Web pages." http://www.altavista.digital.com/...IBM has developed a new way to link the Web with legacy data systems: infoMarket, a search tool that acts as a digital broker for old-fashioned information services. From infoMarket's graphical interface, you'll be able to access financial information, news wires, and market research from suppliers such as the Associated Press, Information Access, and West Publishing. There'll be a fee, of course, but it'll be cheaper than subscribing to each of the pricey databases separately. http://www.infomkt.ibm.com/ —Richard Overton



YOU GET CHARGED ONLY for what you dig up on IBM's infoMarket, which searches specialized fee-based databases via the World Wide Web.

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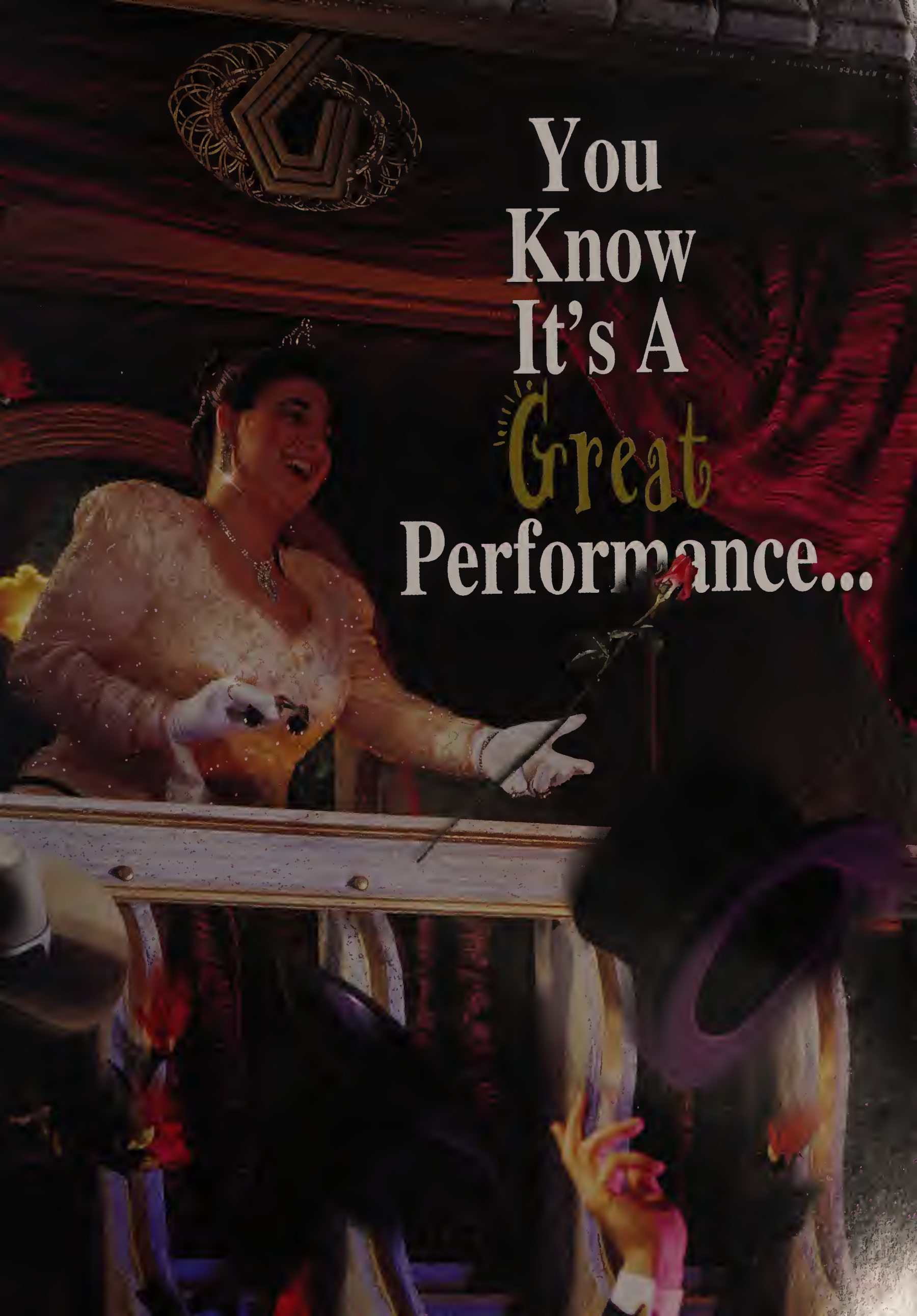

You
Know
It's A
Great
Performance...

If The Sound Blows You Away...

And if it belts out power performance and sound like no other, then it's gotta be a Gateway 2000® computer! Gateway's high-end P5-166XL professional multimedia system gives you extraordinary performance, even for your most robust computing needs. Top it off with the Gateway-exclusive Altec™ Lansing ACS-400 speakers, and the P5-166XL ushers you into first-rate stereo sound! And our new P5-150 Professional system delivers the performance your heavy-duty business applications require — for just $2,899! The Intel® 166MHz and 150MHz Pentium® processors, included on these systems, are the fastest Pentium processors available today. These systems also include the new ATX motherboard, giving you enhanced functionality, usability and reliability.

An Encore 166MHz Performance

Bravo! Gateway's P5-166XL is *"the fastest* Windows 95 PC ever," per *Windows Sources*, February 1996. You'll leap to your feet when you experience all the powered-up features of the P5-166XL. This impressive system is built with 16MB EDO performance DRAM, 512K pipelined burst cache and 2GB hard drive for unbeatable performance.

Maestro of Multimedia

Spine-tingling, heart-thumping stereo sound resonates from your Altec Lansing ACS-400 speakers, standard on the P5-166XL and exclusively from Gateway 2000. Including the Altec ACS-250 subwoofer, these speakers give you thunderous bass and extraordinary Dolby® Surround Sound, breathing new life into all your multimedia applications and music CDs! And you'll be amazed by the ultra-realistic sound achieved with the included Ensoniq® Wavetable sound card. Add these performance features to a Matrox® 2MB WRAM graphics accelerator with MPEG video scaler and your 3-D graphics and multimedia applications will run with incredibly smooth video playback.

The Speedy 6X CD-ROM Drive!

Now standard on all Gateway Professional systems is the 6X CD-ROM drive. This super-fast CD-ROM drive accelerates all your computing experiences to the next level of CD-ROM technology and performance so your applications run ultra fast, *and* you'll be more than ready for tomorrow's complex software applications.

The Right System For All Your Hit Applications

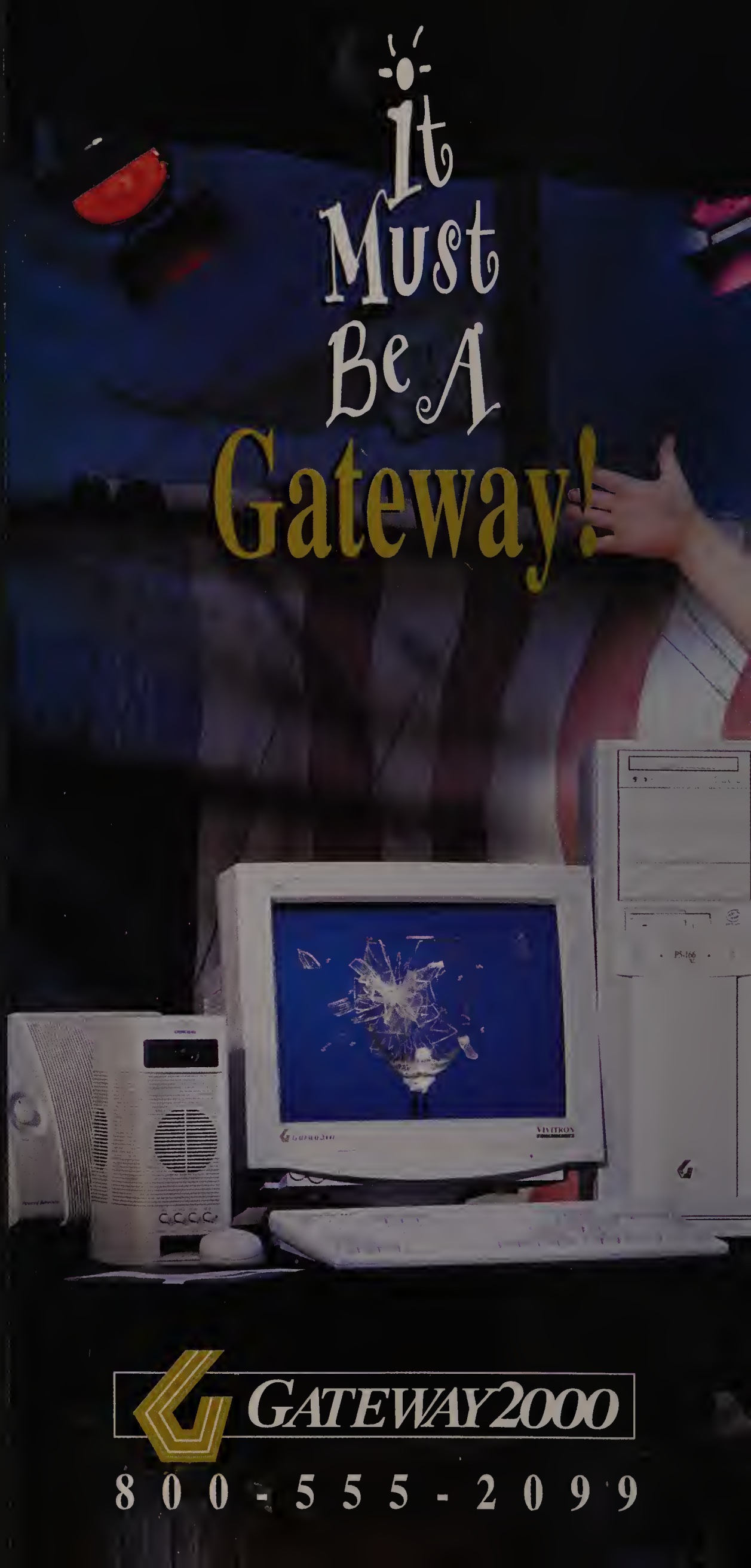
All Gateway Pentium processor-based PCs include Microsoft® Windows® 95, and our Professional models also include MS Office 95, Professional Edition, compatible with 32-bit applications and with backward compatibility for 16-bit applications. If you prefer a different operating system, Gateway gives you a choice of MS-DOS® and Windows for Workgroups, Windows NT,™ or Windows 95, and we'll preload your operating system so your PC is ready to run!

Software Diva

The grand finale: The P5-166XL has one of the *best* software bundles found *anywhere* with MS Office 95, Professional Edition and Gateway's Generations II Software Collection for use with the Windows 95 operating system. It's just what you need for business applications in the Windows 95 environment, *and* for the most complete, updated versions of the latest and greatest multimedia applications, most optimized for Windows 95. A gaming pad is included for use with all your entertainment software.

And Introducing Gateway's P5-150 Professional PC!

For extraordinary levels of performance, Gateway introduces our P5-150 Professional system! It includes the ultra-fast 150MHz Pentium processor, 16MB EDO performance DRAM and 256K pipelined burst cache. All Gateway Professional Pentium processor-based systems have 16MB EDO performance DRAM, and most are standard with pipelined burst cache, adding up to the ultimate in system performance. These features also give you a faster, more cost-effective means to great performance. The P5-150 comes in a new "mini" tower case with similar expansion space found in a desktop case. Because the mini tower case is so compact, you can put it just about anywhere. Call Gateway 2000 today and find out about all our legendary performance machines!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800-555-2099

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If You're In Awe Of Your High-Flying Multitasking Machine...

The Gateway 2000® G6-200: A Legendary Performance

And if you just can't function without jet-set workstation power and performance — we're talking the top-flight machinery available today — then a new Gateway 2000 G6-200 is definitely for you! This new generation of workstations combines a 150MHz or 200MHz Intel® Pentium® Pro processor with Windows NT™ Workstation operating system and a configuration that'll send you soaring into the wild blue computing yonder!

Pilot Your 200MHz Pentium Pro

The Pentium Pro processor is Intel's latest generation processor designed to provide workstation users with ultra-high performance in true 32-bit environments. The Gateway G6-200 is classified as a value workstation, perfect for CAD applications, intense desktop publishing, and graphics and design applications. If you require a load of memory and storage space to run your heavy-duty network applications, you won't find a better value from any other workstation manufacturer.

High-Flying Performance Features

To achieve the high throughput and superior performance your intense applications require, we've included a 2GB Fast SCSI-2 hard drive on the Gateway G6-200. SCSI technology offers better performance in workstation environments. And the SCSI interface allows you to connect up to seven internal SCSI devices, so you can expand like never before. The G6-200 also includes an Adaptec® 2940 32-bit PCI Ultra SCSI Fast-20 controller. Combine all this with 64MB DRAM and your workstation applications will fly!

Gearing Up for Great Graphics!

With the Matrox® 4MB WRAM video card standard on our G6-200, you'll get incredible graphics support at higher resolutions, along with hardware accelerated 3-D support and increased color depth.

Workstation Wonderland with Windows NT Workstation

All right, Windows NT Workstation customers, you know who you are. And we want to get to know you! Gateway 2000 now proudly offers you the best value on the Windows NT Workstation 3.51 operating system in the industry, and standard on Gateway's G6 models. This is one of the most powerful operating systems for any organization that depends on a computer for today's most demanding data-intensive business applications. And if you value the reliability and security of privacy in large workstation environments, Windows NT Workstation is perfect for you.

Great news Windows NT 3.51 users! Your Gateway 2000 G6 system will arrive preloaded with Windows NT Workstation ready to run! Simply determine and enter your individual security codes and passwords during initial setup. We'll configure all G6 systems with the appropriate Windows NT 3.51 drivers, loaded and optimized for compatibility with Gateway hardware and software.

Along with Windows NT, you get MS Office 95, Professional Edition for the best 32-bit business software applications available. And you can upgrade Pentium processor-based and Pentium Pro processor-based PCs to Windows NT for a value that can't be beat!

Call today for more information on our new G6 computers.

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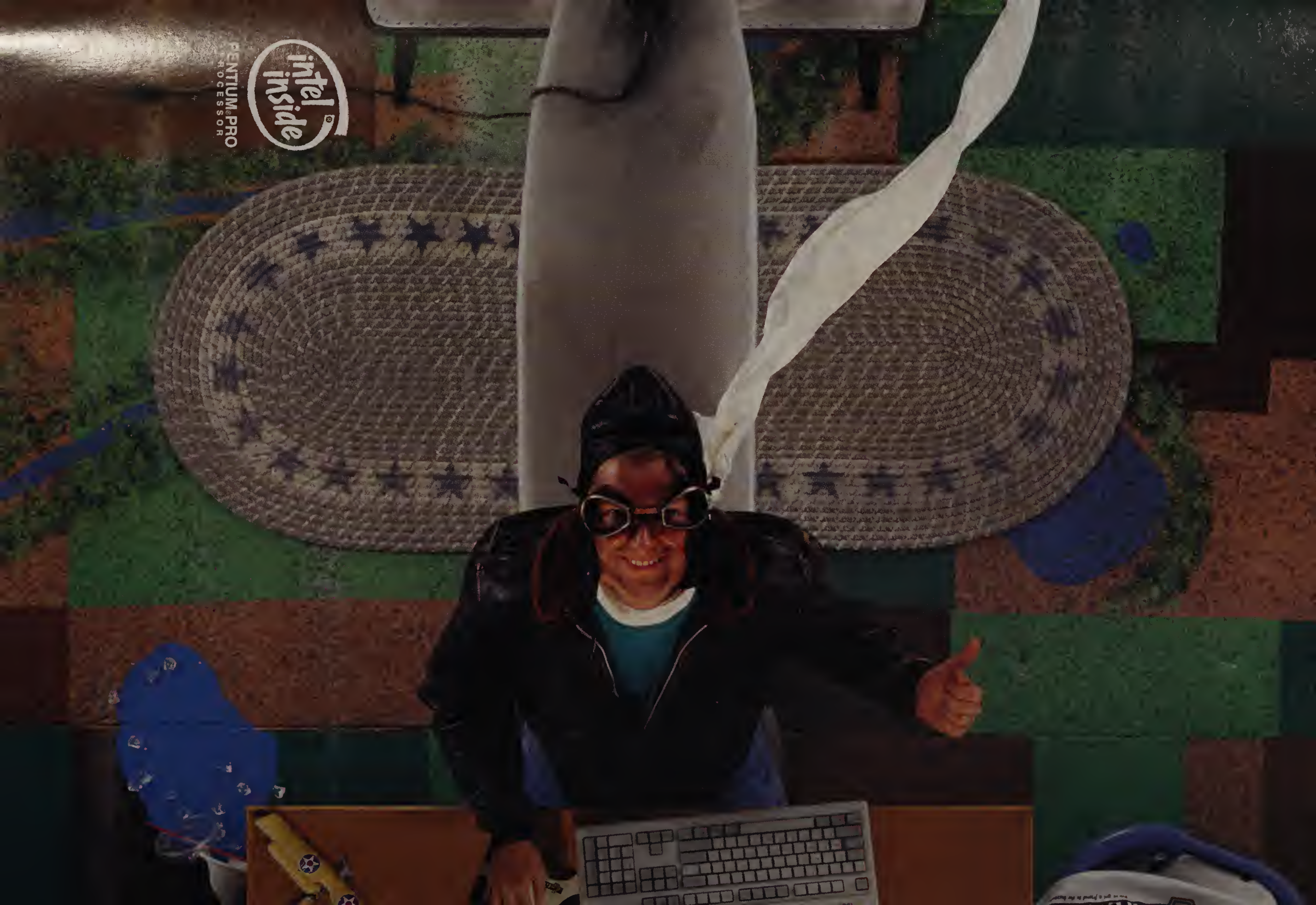
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It Must Be A Gateway!
WINDOWS NT WORKSTATION
GATEWAY2000
800-555-2069

If You've Found The Ultimate Communications Device ...

And if your family has a penchant for the latest (*and coolest*) in multimedia, then it's just got to be a Gateway! All Gateway 2000® Family PC™ multimedia systems provide everything your family needs for education, entertainment and for your home office. And our TelePath® fax/modem with a Telephone Answering Device lets you reach out to neighbors next door or across the globe!

Out Of This World Performance and Features For Your Family!

Along with great multimedia features, the Gateway P5-120 Family PC system includes 16MB EDO performance DRAM and a 1.2GB EIDE hard drive. A 6X CD-ROM drive, standard on all Family PC systems, gives your family the power and performance to get down to serious business or to play thrilling multimedia games.

Holy amplifiers PC buyers! It's Gateway 2000's super stereo sound system: our exclusive Altec™ Lansing ACS-40 speakers and 16-bit Gateway sound card on Family PC systems. Your multimedia applications will blast off with realistic sound, and music CDs will be like *super* music to your ears!

Get Hooked Into MPEG Technology

We wouldn't lead you up an outdated technology tree. No way! Now all Gateway 2000 Family PC multimedia systems include MPEG (Moving Picture Experts Group) data compression technology. MPEG provides superior stereo sound, along with incomparable full-screen, full-motion video right from your CD-ROM drive. Video from MPEG multimedia applications will be smoother. And your multimedia images come to life when combined with the MPEG video scaler, standard on Family PC systems.

Reaching Out To New Worlds With The Gateway 2000 TelePath 28.8

Your communication needs are satisfied with the TelePath 28.8 fax/modem standard on most Gateway Family PC systems! The TelePath fax/modem state-of-the-art with the ability to fax, transfer files and access online services. But there's more! It's also a complete communications tool with a Telephone Answering Device (TAD) for answering machine capabilities. It also includes Gateway's exclusive Information Highway communications CD, with a user-friendly interface and easy-to-use tutorial of included trial memberships to CompuServe®, Prodigy®, America Online® and Reuters Money Network. You also get GNN (Global Network Navigator) for easy Internet access.

Gateway's Generations II Software Collection!

There's virtually no end to your family's educational and entertainment opportunities with the Gateway Generations II Software Collection, for use with the Windows® 95 operating system. Standard on Family PC systems and the P5-166XL, Generations II includes 45 of the latest versions of the world's most popular software applications such as MS Encarta® 96 and MS Cinemania® 96!

Industry-Wide, Prize-Winning Service and Support!

All Gateway systems come with our superb Gateway Gold™ service program for award-winning support, including toll-free technical support for the life of your Gateway computer. When surveyed, *Computer Shopper* readers answered "Gateway 2000!" unequivocally and bestowed us with *Computer Shopper's* 1995 Best Overall Hardware Service and Support award.

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Multimedia Systems

P5-100 FAMILY PC ™

- Intel® 100MHz Pentium® Processor
- 8MB EDO Performance DRAM
- 1.2GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator with MPEG Video Scaler
- 6X EIDE CD-ROM Drive
- 16-Bit Gateway Sound Card
- Altec™ Lansing ACS-40 Speakers
- TelePath® 28.8 Fax/Modem with TAD*
- Gateway Information Highway CD
- 3.5" Diskette Drive
- CrystalScan®15 .28dp Color Monitor (13.9" viewable)
- 7-Bay Desktop Case
- 104+ Keyboard & MS Mouse 2.0
- Microsoft® Windows® 95
- Generations II Software Collection
- Gateway Gold™ Service & Support

P5-100 $2099

P5-75 $1749

(75MHz Pentium processor, 1MB DRAM, 850MB HD, TelePath 14.4 fax/modem, CrystalScan14 w/ 13.4" viewable screen)

P5-120 FAMILY PC

- Intel 120MHz Pentium Processor
- 16MB EDO Performance DRAM
- 1.2GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator with MPEG Video Scaler
- 6X EIDE CD-ROM Drive
- 16-Bit Gateway Sound Card
- Altec Lansing ACS-40 Speakers
- TelePath 28.8 Fax/Modem with TAD*
- Gateway Information Highway CD
- 3.5" Diskette Drive
- Vivitron™15 .26dp Color Monitor (13.9" viewable)
- 7-Bay Desktop Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations II Software Collection
- Gateway Gold Service & Support

$2499

P5-133 FAMILY PC

- Intel 133MHz Pentium Processor
- 16MB EDO Performance DRAM
- 1.62GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator with MPEG Video Scaler
- 6X EIDE CD-ROM Drive
- 16-Bit Gateway Sound Card
- Altec Lansing ACS-40 Speakers with ACS-250 Subwoofer
- TelePath 28.8 Fax/Modem with TAD*
- Gateway Information Highway CD
- 3.5" Diskette Drive
- CrystalScan17 .28dp Color Monitor (15.7" viewable)
- 7-Bay Desktop Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations II Software Collection
- Gateway Gold Service & Support

$2899

** Telephone Answering Device (TAD) gives you complete voice messaging capabilities.*

P5-166XL

- Intel 166MHz Pentium Processor
- 16MB EDO Performance DRAM
- 512K Pipelined Burst Cache
- 2GB EIDE 10ms Hard Drive
- Matrox® 2MB WRAM Graphics Accelerator w/ MPEG Video Scaler
- 6X EIDE CD-ROM Drive
- 16-Bit Ensoniq® Wavetable Sound Card
- Altec Lansing ACS-400 Speakers with ACS-250 Subwoofer
- TelePath 28.8 Fax/Modem with TAD*
- Gateway Information Highway CD
- 3.5" Diskette Drive
- Vivitron17 .26dp Color Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition**
- Generations II Software Collection with Gaming Pad
- Gateway Gold Premium Service

$3899

Professional Systems

P5-75

- Intel 75MHz Pentium Processor
- 16MB EDO Performance DRAM
- 850MB 10ms EIDE Hard Drive
- 1MB DRAM, 64-Bit PCI Graphics Accelerator
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- CrystalScan15 .28dp Color Monitor (13.9" viewable)
- 7-Bay Desktop Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition**
- Gateway Gold Service & Support

$1899

P5-120

- Intel 120MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 1.2GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron15 .26dp Color Monitor (13.9" viewable)
- 7-Bay Desktop Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition**
- Gateway Gold Service & Support

$2299

P5-133

- Intel 133MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 1.2GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron15 .26dp Color Monitor (13.9" viewable)
- 7-Bay Desktop Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition**
- Gateway Gold Service & Support

$2399

P5-150

- Intel 150MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 1.62GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron17 .26dp Color Monitor (15.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition**
- Gateway Gold Service & Support

$2899

*** MS Office 95, Professional Edition includes Word, Excel, PowerPoint® presentation graphics program, Schedule+, Access database and Bookshelf® '95.*

Workstations

G6-150

- Intel 150MHz Pentium Pro Processor
- 32MB DRAM
- 256K Internal Cache
- 2GB 10ms EIDE hard drive
- Matrox 2MB WRAM Graphics Accelerator w/ Video Scaler
- 6X EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron17 .26dp Color Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows NT Workstation 3.51
- MS Office 95, Professional Edition**
- Gateway Gold Service & Support

$4299

G6-200

- Intel 200MHz Pentium Pro Processor
- 64MB DRAM
- 256K Internal Cache
- 2GB Fast SCSI-2 9ms Hard Drive
- Adaptec® 2940 32-bit PCI Ultra SCSI Fast-20 Controller
- Matrox 4MB WRAM Graphics Accelerator w/ Video Scaler
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- 3.5" Diskette Drive
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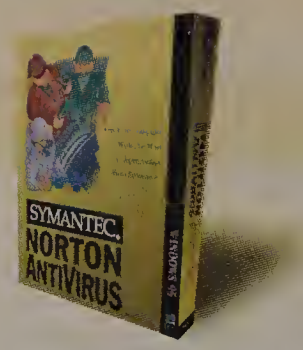

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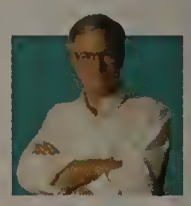

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New Cyrix Systems Challenge Intel Pentiums

The widely anticipated Cyrix 6x86 chip, a direct challenger to Intel's high-end 133-MHz Pentium processor, has finally come to market in a handful of desktop PCs from Epson, MicroExpress, CompuTrend, and AST. Unfortunately, preliminary evaluations of two of these systems find them less competitive than expected: In our tests, a prototype machine built by Cyrix performed faster than they did, and their prices aren't dramatically better than those of comparable Pentium PCs.

PRICED TO PERFORM: At $2499, the MicroFlex-686/100 is priced competitively with a 120-MHz Pentium desktop.

Among the first batch of systems based on the Cyrix 6x86 is the MicroFlex-686/100 from MicroExpress, a company that's known for value-priced PCs. This $2499 system has a basic configuration of 16MB of RAM, a 1GB hard drive, Windows 95, and a 256K secondary cache. Also standard is a quad-speed CD-ROM drive, a 15-inch monitor, and a graphics accelerator with 2MB of DRAM. Unfortunately, at $2499 this system doesn't include extra features such as EDO RAM, a sound card, a fax-modem, or multimedia software. So while its base price is comparable to that of a Pentium-100 or P-120, the cost jumps into the range of a Pentium-133 when you add the missing extras.

Epson's Cyrix 6x86 desktop, the ActionTower 9200, is more competitive. The ActionTower comes standard with performance enhancers such as 16MB of EDO RAM and a 256K pipeline-burst secondary cache. It also uses Intel's Triton PCI chip set to optimize CPU performance, Epson says. The $2899 price includes Windows 95, a 1.6GB hard drive, a 15-inch monitor, and a graphics accelerator with 1MB of VRAM. And Epson didn't forget the multimedia devices: A quad-speed CD-ROM drive, a 16-bit sound card, and 30 entertainment and education CD-ROM titles are standard. There's also a 28.8-kbps fax-modem with speakerphone and voice-mail system. The standard features and price put the ActionTower in the same range as most Pentium-120 systems and even some Pentium-133 desktops.

Both MicroExpress and Epson claim that performance of their 6x86 systems will equal that of a P-133 system, but our tests don't confirm this. We ran Win 95 benchmark tests on a preproduction model of the ActionTower 9200 using Win 95 versions of Word, Excel, and Micrografx Picture Publisher. The ActionTower 9200 could not keep up with many of the P-133 desktops we've tested: In tests of a preproduction ActionTower with 16MB of RAM, the desktop was almost 28 percent slower than a Dell Dimension XPS 133-MHz Pentium system with 16MB of RAM. The MicroFlex fared much better: With 32MB of RAM, it was roughly 7.5 percent slower than the 133-MHz Dell unit and turned in numbers comparable to tests we've run on preproduction 150-MHz Pentium systems.

EPSON'S ACTIONTOWER 9200 comes packed with goodies such as EDO RAM and pipeline-burst cache.

If the performance of 6x86 PCs closes in on that of Pentium-133s, they'll be worth considering, especially if vendors can offer comparably configured systems at lower prices.

—Arden M. Hoffman

Epson ActionTower 9200

A loaded system priced for the home or office.
Epson America Inc.
800/289-3776, 310/782-0770
Street price: $2899

MicroFlex-686/100

A budget Cyrix-based desktop with few perks.
MicroExpress
800/989-9900, 714/852-1400
Street price: $2499
Reader service no. 673

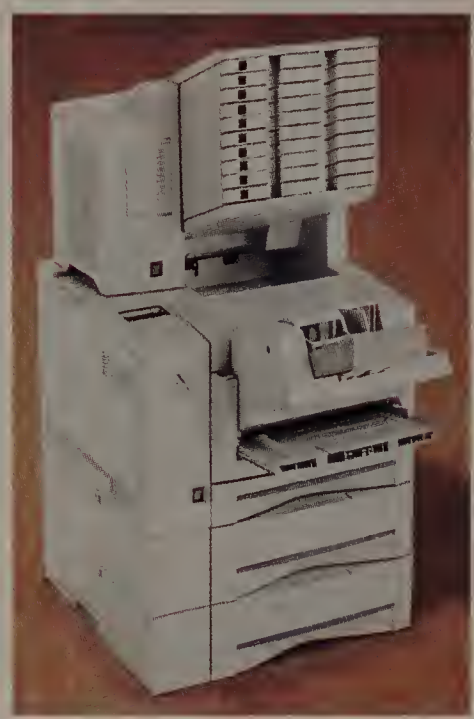
Smarter Than the Average Laser

Xerox: It's not just copiers anymore. Special options for the company's latest personal and network laser printers should make you look at them twice. The DocuPrint 4508 personal laser printer offers above-average speed and paper capacity. The network model, the DocuPrint 4517, has sophisticated features and an attractive price.

For your desktop, the sleek DocuPrint 4508 offers 600-dpi resolution and a rated print speed of 8 pages per minute, better than the 6 ppm typical of other laser printers. Expected to sell for $695, the printer incorporates a 250-sheet standard paper tray (most laser printers offer only 150-sheet trays). For $130, you can add a second 250-sheet tray that stacks directly underneath the printer. At 14.2 inches wide by 13.6 inches deep, the compact design takes a minimum of space. The printer comes with 2MB of RAM (upgradable to 34MB) and PCL5e emulation.

For an office network, the 17-ppm Xerox DocuPrint 4517 printer has some unique advantages, starting with a street price of about $1850 with 2MB of RAM (upgradable to 64MB) and PCL5e emulation. A second model, the $2450 DocuPrint 4517mp, includes Adobe PostScript Level 2; 6MB of RAM; and ethernet, token ring, or AppleTalk networking capability. The 4517 and 4517mp models both support 600-dpi printing with 1200-by-600-dpi resolution for gray-scale images, and edge smoothing for text.

The Xerox 4517 printers are priced comparably to Lexmark's 16-ppm Optra line, which also supports up to 1200-by-600-dpi resolution. The Xerox units are priced considerably less than Hewlett-Packard's 24-ppm LaserJet 5Si, which costs $3499. Although faster, the LaserJet 5Si supports only 600-dpi resolution.



PRINTER PRIVACY: Xerox offers a mailbox/collator with password options for personal access.

A 250-sheet paper tray and 100-sheet bypass feeder come standard; two optional stacking trays add up to a 1350-sheet capacity. The network models can accept a $400 duplex option as well.

Also, if you need to print confidential documents, an $1009 mailbox/collator add-on device can be configured with individual locked printer mailboxes; yours opens when you enter an ID number via the printer's LCD panel. Units weren't ready for testing at press time, but we saw preproduction models in November.

Xerox's network management software monitors both Xerox and Hewlett-Packard laser printers on a Novell NetWare LAN.

—Laurianne McLaughlin

Xerox DocuPrint 4508, 4517, and 4517mp

Speedy 8-ppm personal laser; 17-ppm network laser with unique options.
Xerox
800/349-3769
Street price: 4508 model $695, 4517 model $1850, 4517mp model $2450
Reader service no. 674

Contour Mouse Fits Like a Glove

Sometimes finding a good mouse can make you feel like Goldilocks choosing her perfect chair: This one is too big, that one too small.

But a new line of mice from Contour Design could take some of the strain off tired wrist and elbow muscles.

The product comes in three sizes. My hands are small, so I appreciated the junior-size mouse (for hands less than 6¾ inches long, which is about a woman's medium glove size). I felt an immediate difference between the sizes: The two larger mice (for hands over 7½ inches, a large man's hand, and for hands 6¾ inches to 7½ inches, a large woman's hand), were both too large for my petite paw.

The Contour Mouse is shaped to fit the length of your hand. Less kidney shaped than Microsoft's ergonomic mouse, this one looks like a backward apostrophe; a slope on the right side accommodates the outer part of your right hand (southpaws are out of luck). There's a thumb rest on the left side, and the three buttons are grooved slightly to cradle your fingers. The design lets your hand splay over the mouse, rather than grip it. These features seem to work: My thumb feels less constricted and tense when I use this mouse.

The Contour Mouse has a street price of $59.95. I didn't look at the software, but the company says the three buttons can be programmed or assigned custom macros.

If you have been feeling a bit pinched by a mouse that doesn't fit you, it might be time to check out one that doesn't strain your hand or your wallet.

—Gabrielle Mitchell

Contour Mouse

Ergonomic mice come in three sizes.
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Magic Link: Sleight-of-Hand Communicator

Buying a personal communicator is a bit like a shell game: Your money will be gone before you know it. And after plunking down a chunk of change for the device, you usually have to spend a bundle on add-ons and upgrades to make the thing truly useful.

Sony's new Magic Link PIC-2000 is an improvement over the original PIC-1000. Besides the easy-to-navigate cartoon interface, some newly added features are especially appealing in a handheld device, most notably a backlit screen. While this option is a big drain on batteries, it's so much easier to use the Magic Link with backlighting that I'd call it a worthwhile sacrifice.

The new Magic Link uses release 1.5 of General Magic's Magic Cap operating system. The touch screen is sensitive even to a finger tap, so moving between applications or clusters of apps, as you do on the desktop, is effortless. The basic applications—Datebook, Name card file, Notebook, and Spell Finder—are built into ROM. Also in ROM is a selection of communications software: America Online, AT&T PersonaLink, and OAG FlightLine (an airline information service). I had no trouble getting online thanks to the built-in RJ-11 phone jack and 14.4-kbps modem (a big improvement over the slower speeds of the original—2400-bps data, 9600-bps fax). Travelers who depend on hotel phones may also appreciate the Magic Link's built-in speakerphone.

The Magic Link features two PC Card Type II slots, 2MB of RAM, and a $899.95 price tag. By comparison, the PIC-1000, which now lists for $499.95, has only 1MB of RAM and one PC Card Type II slot. The PC Card slots are useful for adding memory or applications, but because the Magic Link employs the Magic Cap operating system, your software options are limited.

If you want to get your Magic Link files synchronized with your desktop files, $99.95 gets you Magic Xchange for Windows, an add-on pack that includes a serial connection cable and provides two-way file transfer for ASCII, Schedule+, and some handheld organizer programs. File translation support for Act For Windows, dBASE, Excel, Paradox, and a few other applications costs an additional $39.95. A pager card runs $249.95 (so why not buy a conventional pager instead?). A $249 cellular modem PC Card and software should ship by February, the same time as the Magic Link. I liked using the Magic Link, but as with the OmniGo 100 and other handheld devices, the price of entry gets you only so far: When you tack on desirable add-ons, your bill can climb very fast.

—Gabrielle Mitchell

SONY'S MAGIC LINK PIC-2000 is easy to use, thanks to a backlit screen.

Magic Link PIC-2000

Personal communicator with simple interface.
Sony Electronics Inc.
800/571-7669
List price: $899.95, Magic Xchange for Windows $99.95, pager card $249.95
Reader service no. 676

Multimedia Upgrade for the Technically Challenged

If you've avoided upgrading your system with a CD-ROM and sound card because the thought of working in the guts of your computer was intimidating, the cavalry has arrived.

Micro Solutions' CD-ROM Backpack gives you multimedia capabilities without installation headaches. The Backpack, which includes a CD-ROM drive and 16-bit sound card, simply plugs into your PC's parallel port. The Backpack has a pass-through adapter for your printer—just plug the Backpack into your computer, and plug your printer into the Backpack.

The CD-ROM Backpack works without a SCSI adapter or interface card in your computer. The drive's performance will depend on what kind of parallel port you have on your system. If your desktop or notebook has an Enhanced Parallel Port—a Windows 95–supported parallel port that allows faster data transfer rates—the CD-ROM can achieve up to 600K/sec, as fast as a quad-speed drive, according to Micro Express. If you have the garden-variety bidirectional parallel port, you'll see half that rate, or about 330K/sec—the same performance you'd get from a decent double-speed drive.

This model also comes with a 16-bit sound card, although you can get a drive without one if you prefer. The Backpack's card works with your system like a regular sound card, so even if you are not using the CD-ROM drive, you can still have sound. It would have been helpful to have a wavetable card for more realistic MIDI music as opposed to the flat FM synthesis. At $499, this isn't a bargain-basement solution, but for the technically shy, the Backpack could be the perfect starter kit.

—Shane Mooney

CD-ROM Backpack

Easier to install than conventional drives, but less powerful.
Micro Solutions
List price: $499
800/890-7227, 815/756-3411
Reader service no. 677

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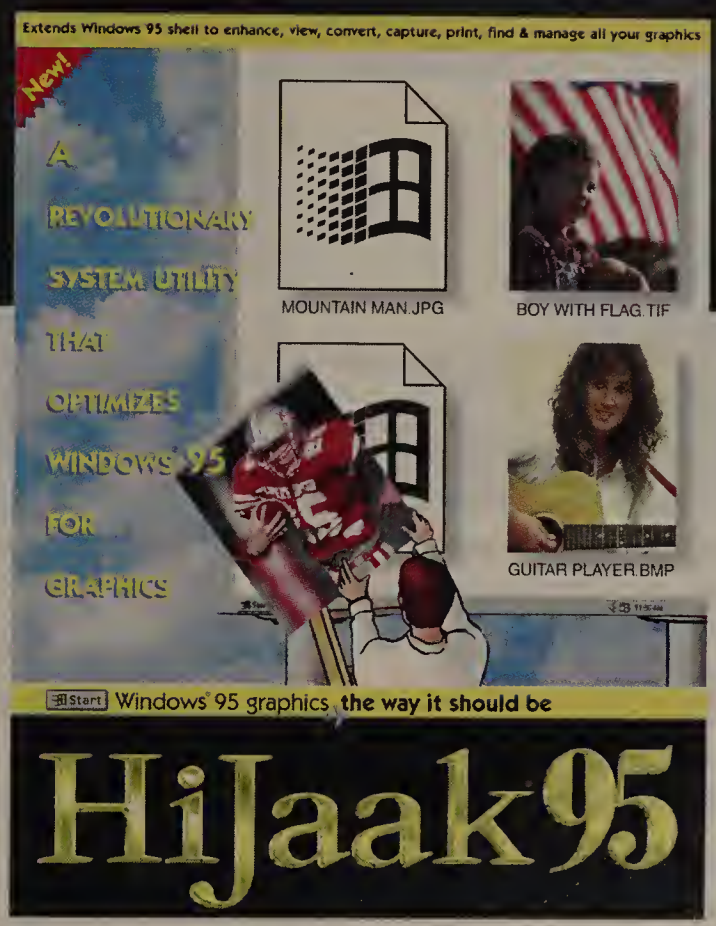
System Utility to Optimize Windows 95 for Graphics!



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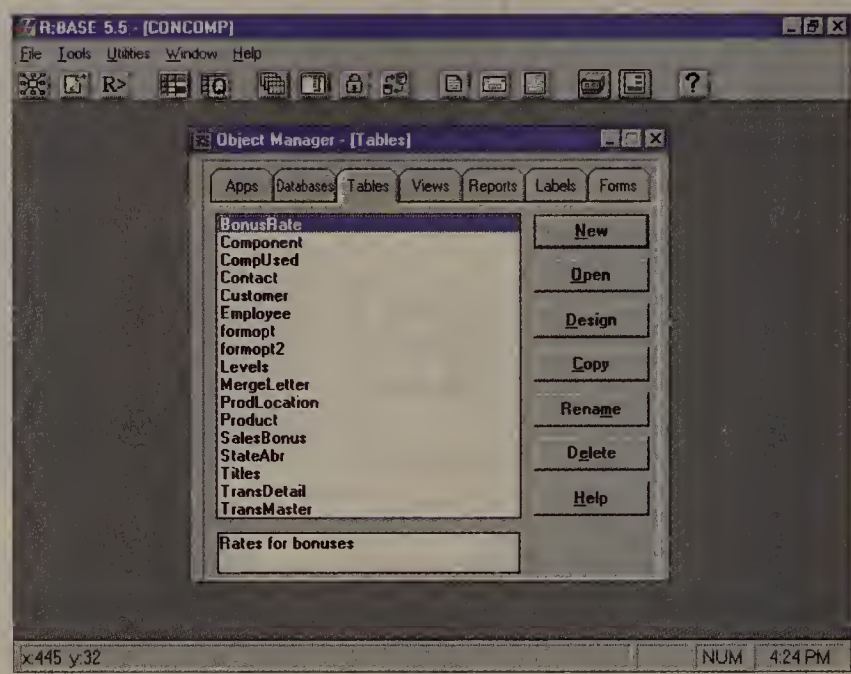
R:BASE and 4th Dimension Join the Win 95 Database Bandwagon

Two databases with a small but loyal user community have converted to Windows 95. Microrim's R:BASE has been upgraded for the Win 95 environment, while 4th Dimension from ACI US has been moved from the Macintosh platform, where it has been a popular database program for some time. Still, in features and accessibility they lag other big databases like Paradox, Access, and Approach.



R:BASE 5.5 FOR WINDOWS offers Object Manager, a window that gives you quick access to database objects.

R:BASE 5.5 for Windows

From what I saw in a demonstration of R:BASE for Windows, it has kept the feel of the older DOS program while offering new features like Object Manager. Object Manager gives you a bird's-eye view of whatever objects (forms, tables, reports) you have in a database and lets you access them with a few mouse clicks.

The new version runs under Windows NT, Windows 95, and OS/2 Warp 3; it also allows you to share databases with all other versions of R:BASE, including R:BASE 4.5++ for DOS. When you're ready to move applications to Windows, you'll find built-in utilities to help with the process.

Application Express, R:BASE's program generator, is designed to let you create custom database applications without having to write code. For people who prefer to type in commands, there's the R:BASE R> prompt, so you can, for example, quickly modify a query at the prompt instead of wading through the Windows interface. This is a nice convenience for old-time R:BASE fans and experts, but new users may prefer to avoid this option altogether.

One of R:BASE's claims to fame is its implementation of "true" relational data management. This means you don't have to worry about maintaining the values used to link tables of related data. I was unable to test this feature in the Windows 95 version, but it worked nicely in the older DOS versions.

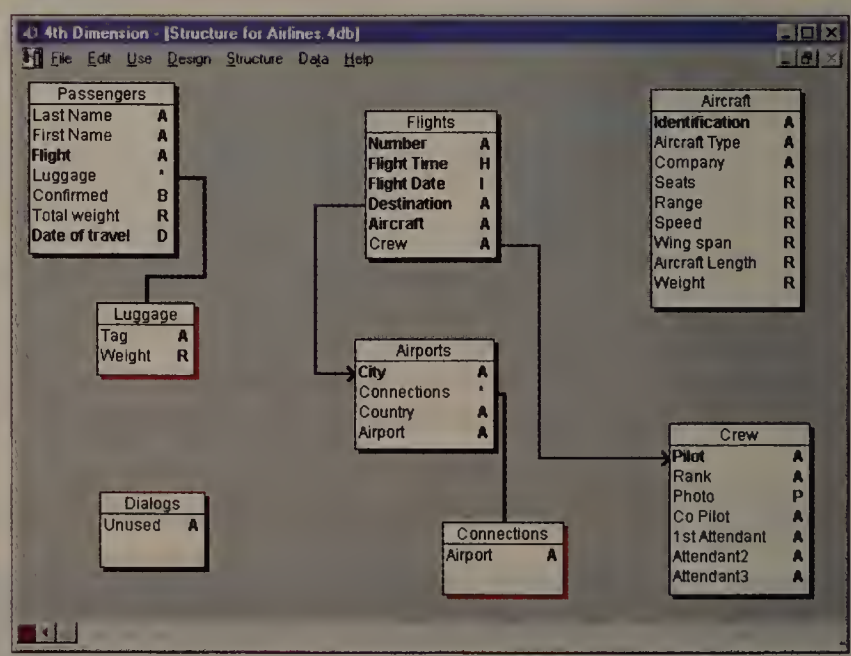
On the downside, I didn't like this version's table design window. You need to understand concepts like foreign keys, and you have to create indexes to link files. Also, the linking process is a lot easier in programs like Approach where all you have to do is draw lines that show which files to join.

4th Dimension 3.5

This program has a foreign feel to me, but if you're migrating to Windows from the Macintosh environment, you'll probably be familiar with it. 4D now runs under Windows 95 and Windows NT as well as on the Mac. Application developers will appreciate 4D's cross-platform capabilities. Developers can create one program and then compile it to run under the various supported platforms without writing separate code for each.

But 4D doesn't offer the quick form and report layouts for related files that are now standard in other Windows database programs such as Access and Paradox. It also lacks helpers like the Paradox experts or Microsoft wizards that walk you through setting up sophisticated reports. It does have a window where you can easily draw relationships between data files, but this simplicity doesn't carry over to the document design tools.

—Celeste Robinson



4D LETS YOU DESIGN an entire database of related files in one window, where you can draw lines to show relationships between files.

R:BASE 5.5 for Windows

Benefits for DOS R:BASE users but no state-of-the-art conveniences.

Microrim
800/628-6990
List price: $495
Reader service no. 641

4th Dimension 3.5

A nice solution for 4D developers porting their apps to Windows.

ACI US, Inc.
408/252-4444
List price: $895
Reader service no. 642

For some people, it's enough to know that MagnaRAM multiplies their computers' memory. Others require a slightly more detailed explanation.

Dan Spear is a Quarterdeck Fellow and Senior Director of Advanced Research. He was the primary developer of QEMM, co-creator of the VCPI Specification, and holds two patents on memory management.

By Dan Spear

MagnaRAM — More Memory Without More Chips.

MagnaRAM is a utility for Windows® 95 and Windows 3.1 that gives you more usable memory. Using memory compression, MagnaRAM simply takes the physical memory on your system and stores more data in it. With MagnaRAM, you can run more and larger programs.

So how does MagnaRAM work? First, let me explain what memory compression and VxDs are all about.

Memory Compression?

If you have 1000 bytes of memory, how can you store more than 1000 bytes of information in it? MagnaRAM uses memory compression to pack up your data to fit into a smaller space.

Several programming techniques allow MagnaRAM to store data in less memory. One method involves noticing a repeating sequence of data, and storing the pattern instead of the data. For example, if you have 1000 bytes of data, all of which are the letter "A," you can represent them as (1000 A's), and save hundreds of bytes.

Open Up Windows With VxDs.

If you want to compress data stored in memory in Windows applications, you need a mechanism which is automatic and invisible — part of the operating system itself. Fortunately, Windows lets you add additional features to the operating system. How? By writing a driver called a VxD. One of the interesting things a VxD can do is enhance another VxD by replacing its functions.

How MagnaRAM Lives Up To Its Name.

MagnaRAM enhances the VxD responsible for virtual memory, which effectively increases memory by temporarily using your hard disk as if it were more memory.

MagnaRAM reserves some physical memory for a compression buffer. It hooks into the service that is responsible for reading and writing data to your hard disk for virtual memory. When the operating system wants to write a page to disk, MagnaRAM copies the data into the compression buffer and tells the operating system that everything's O.K. Later, while the system is idle, MagnaRAM crawls through its buffer compressing the data. If the buffer gets filled up, MagnaRAM writes its compressed data to disk, so you write less to disk. When the operating system needs the data back again, MagnaRAM fetches it from either the buffer or the disk, decompresses it, and hands it back. This is invisible to the applications, the virtual memory system, and even the VxD that writes the data to disk.

This process allows more data to be stored in memory without going to disk because MagnaRAM has compressed the data to a fraction of its original size. Available Windows memory increases by a significant amount, even with the same amount of memory and disk space usage. Although MagnaRAM's compression and decompression do take time, they are typically faster than disk access. System performance can vary depending on the types of applications and the degree of compression that MagnaRAM can achieve.

MagnaRAM will give you more memory; I encourage you to visit your local retailer and try out the product for yourself. For more information, give us a call at 1-800-683-6696. Or go to our website at http://www.quarterdeck.com.

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Circle 190 on reader service card

Simplify Bookkeeping With Simply Accounting

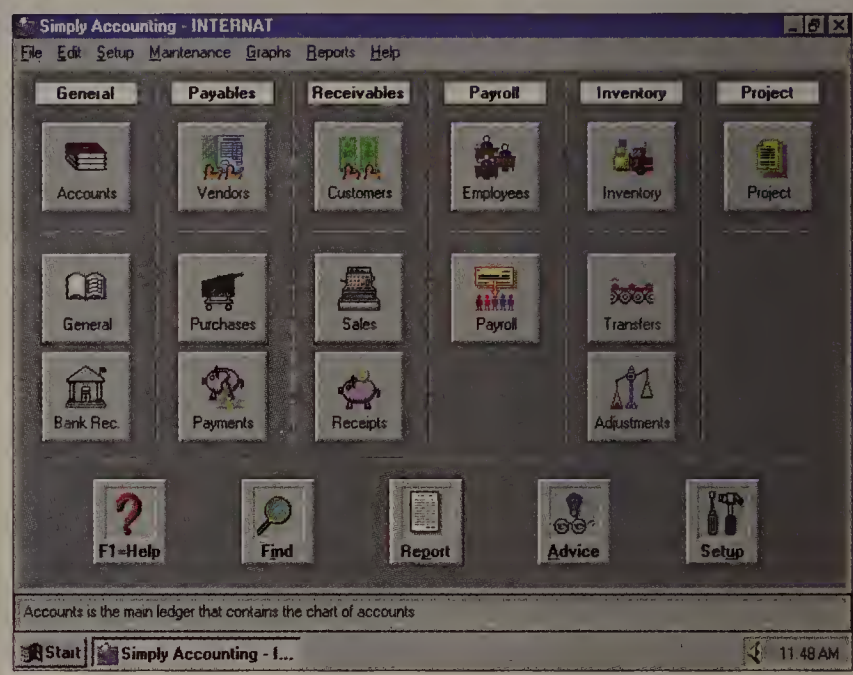
If you're looking for a no-frills, inexpensive small-business accounting system, then Simply Accounting 4.0 for Windows fits the bill.

This new version of the venerable accounting program from 4Home Productions (a division of Computer Associates) handles a broad range of bookkeeping functions, including general ledger, accounts payable, accounts receivable, payroll, inventory, and project costing. If that seems a bit much, Simply Accounting lets you organize menus to hide the ledgers and journals you never use. This single-user program, now in its second decade, had fallen behind some newcomers to small-business bookkeeping, such as Intuit's QuickBooks (see *New Products*, January). However, a number of enhancements now bridge the gap between Simply Accounting and the competition.

Simply Accounting has always been one of the better-looking accounting programs. The enhanced business graphics in this version make it easier to spot problems on the fly. In the beta I reviewed, tool buttons let me quickly access financial reports and advice. To view and print a list of the general ledger accounts, I just dragged and dropped the GL accounts icon onto the reports tool button.

Simply Accounting still does not have a contact manager or a to-do list, common features in slightly more expensive programs, but you can import data from other contact managers. (In the near future, the Maximizer contact manager is expected to be bundled with Simply Accounting, according to the vendor.)

Most impressive, though, are Simply Accounting's forms capabilities, which surpass those found in many pricier packages. You can design your own invoices, checks, and statements from scratch or customize standard forms. And the forms can be printed to blank paper, a cost saver compared to expensive preprinted forms.



SIMPLY ACCOUNTING OFFERS DRAG-AND-DROP ICONS to speed your bookkeeping and help keep you organized.

Version 4.0 contains features such as online records that make it easier to track year-to-year finances and maintain recurring entries. It also has improved inventory management. Simply said, what this accounting package lacks in administrative aids, it compensates for in other features.

—Richard Morochove

Simply Accounting 4.0 for Windows

Basic, inexpensive business bookkeeping.
4Home Productions, Computer Associates
800/773-5445
Street price: $69
Reader service no. 643

Quick and Not-So-Dirty Presentations

When you've got a tight deadline and need a good-looking presentation, look no further than Software Publishing Corporation's ASAP WordPower 1.95.

Carrying on the tradition of what we liked in version 1.0 of ASAP (see last November's *New Products*), this Windows 95 presentation program lets you create a dynamic show in minutes by either modifying an included template or starting from scratch and importing elements like text and charts. You have fewer options than you do with PowerPoint or Harvard Graphics, but when I worked with a beta of this fast 32-bit Windows 95 program I was able to create a short presentation that incorporated text, sounds, and video in no time.

All it takes is a few guided steps from ASAP. After creating an outline with a title page, headings, subheadings, and minor points, you'll shift to preview mode so you can choose a color scheme, design, and layout. ASAP comes with 18 color schemes, 14 designs, and 22 layouts. Preview mode has several editing features, including the ability to import pictures, logos, sounds, and even PowerPoint presentations and slides.

ASAP is a good, quick solution for small jobs. You can't create more than one presentation at a time, and the undo function is limited. But with ASAP's uncomplicated interface, you can produce presentations before your deadline.

—Joe Peschel

ASAP WordPower 1.95

Inexpensive Windows 95 presentation software for pros and novices.
Software Publishing Corp.
800/336-8360, 406/986-8000
http://www.spco.com
Street price: $99
Reader service no. 644

QUARTERDECK

Quarterdeck CleanSweep™ 95 is the first 32-bit uninstaller for all versions of Windows. We also believe it's the only uninstaller worth looking at, period. But you don't have to take our word for it. "When you delete files, CleanSweep bundles them into a package, compresses them, and archives them where it can find them again... this looks to be... one of the 'must have' Windows '95 supplementary programs." JERRY POURNELLE, BYTE, NOV 95 "CleanSweep 95's user interface is still the simplest and most intuitive of all the commercial uninstallers PC Week Labs has seen... CleanSweep's system cleanup features were very strong, helping us find duplicated, unused, and orphaned files to remove from our systems." JIM RAPOZA, PC WEEK, NOV 95 "To the rescue comes Quarterdeck's new CleanSweep. When I installed CleanSweep, I had a spindly 5MB left on my 340MB hard disk's C: partition. As I write this I have 33MB. CleanSweep 95... is the janitor who can get you back that accidentally tossed manila folder the next day. It gives you a new lease on disk space with a vow never to let you junk your drive up again." PAUL ANDREWS, SEATTLE TIMES, OCT 95

Circle 225 on reader service card

For a free trial edition of CleanSweep 95, call us at 1-800-683-6696, go to our web site: http://www.quarterdeck.com or simply visit your local retailer.

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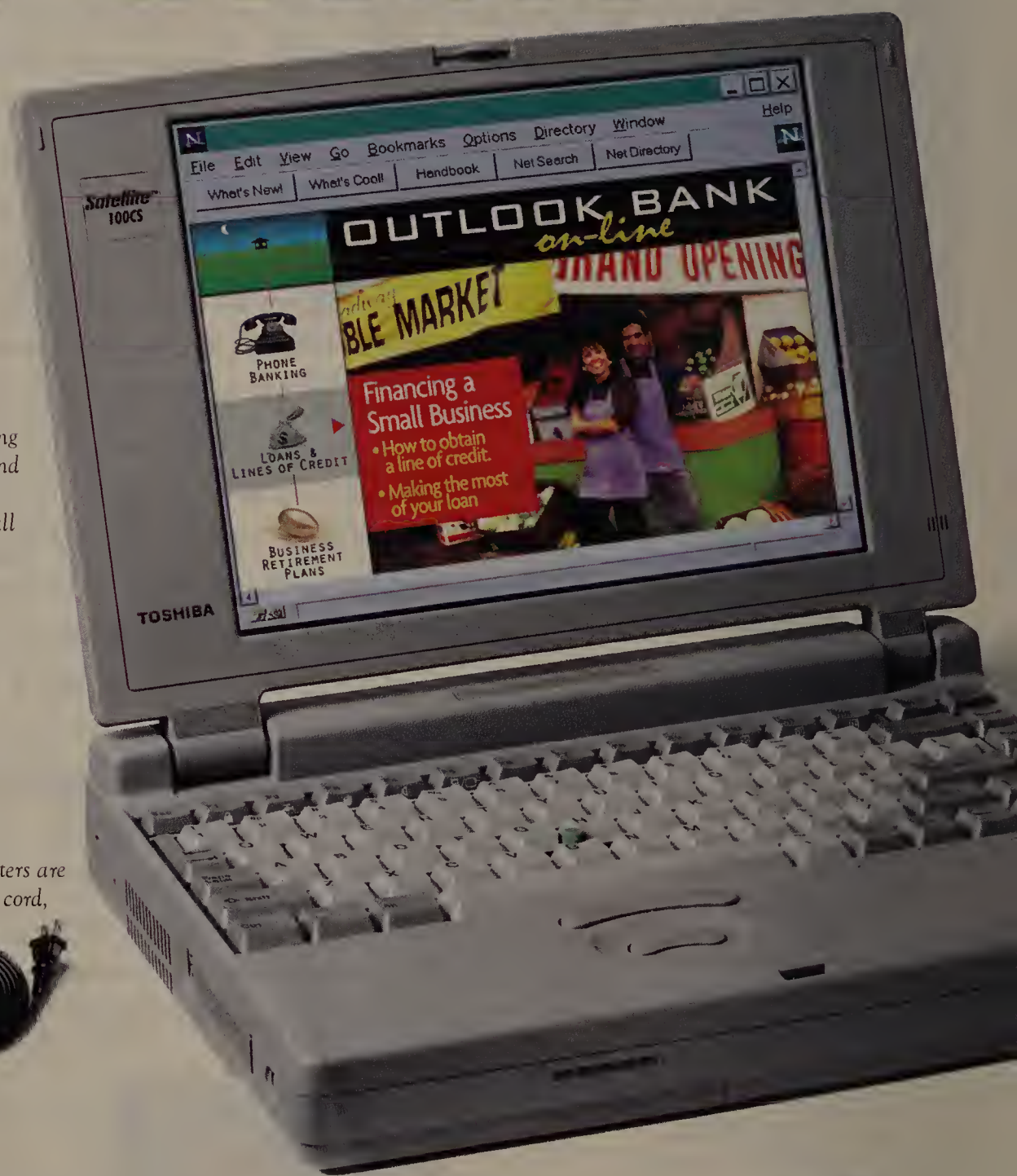
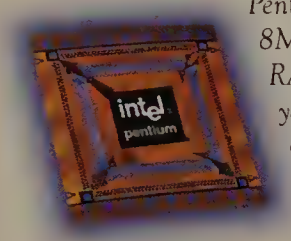
PENTIUM PUNCH.



75MHz PENTIUM® PROCESSOR

Today's complex software demands fast computing speeds. With this quick-thinking Pentium processor and 8MB of fast EDO RAM, you'll run all your applications with ease.



BUILT-IN POWER SUPPLY

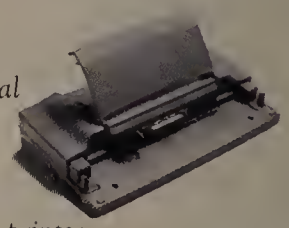
The days of bulky, hard-to-pack AC adapters are over. Now all you need is this slim power cord, which fits easily in your case. Even better, it's actually long enough to easily reach an outlet from your desk or chair.

PC MAGAZINE "A" RATING

PC Magazine has awarded us their coveted "A" rating for service and technical support. So wherever you use your Toshiba computer, you can be confident we'll be there for you.

NEW NOTEDOCK™

At home or the office, Toshiba's optional NoteDock Enhanced Port Replicator provides two PC Card Type III slots and allows one-step connection to your external monitor, keyboard, mouse and printer.



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KNOCKOUT PRICE.

$1999

Satellite 100CS

INTRODUCING THE NEW SATELLITE® SERIES. Now you can get the quality of a Toshiba and the power of a Pentium processor, without taking a financial hit. In the new Satellite Series, you'll also find a huge 10.4" color display, 8MB of lightning fast EDO RAM, and a 528 million byte hard disk drive. It's a real knockout. Call 1-800-457-7777 for more information or a dealer near you.

Satellite®

100CS*:
- 75MHz Pentium® processor
- 10.4" dia. color DSTN dual-scan display
- 528 Million Byte (=504MB) HDD
- 8MB EDO RAM expandable to 40MB
- 16KB cache
- VL local-bus video
- Two stacked PC Card (PCMCIA) slots (two Type II or one Type III)
- Plug and Play Connectivity
- Built-in AC adapter
- Accupoint™ integrated pointing device
- Optional NoteDock™ Enhanced Port Replicator
- 3.5" floppy disk drive
- 6.9 lbs.
- Pre-installed software: Windows® 95 or MS-DOS® with Windows 3.11
- Toll-free technical support - 7 days a week, 24 hours a day

Designed for Microsoft® Windows® 95

intel inside pentium™ PROCESSOR

In Touch with Tomorrow
TOSHIBA

Toshiba. The World's Best Selling Portable Computers.

Circle 228 on reader service card

Dump Unwanted Apps With WinCheckIt, UnInstaller

If you've made the move to Windows 95, you've probably experienced an unpleasant surprise when trying to run some of your old Windows and DOS utility programs. You're often stuck with a worthless program taking up space on your hard drive.

The good news is that Windows 95–compliant utilities are now available. These include TouchStone Software's $39.95 WinCheckIt 4.0 and MicroHelp's $29.95 UnInstaller 3. Although Windows 95 has an uninstall feature, third-party utilities like these are usually more thorough in cleaning up your system.

WinCheckIt is a computer nerd's dream. It runs a series of comprehensive tests on your PC to see which components are working properly, and it benchmarks the system to gauge its performance.

My only gripe with WinCheckIt's diagnostic capabilities is that the program could do a better job of explaining the significance of its findings.

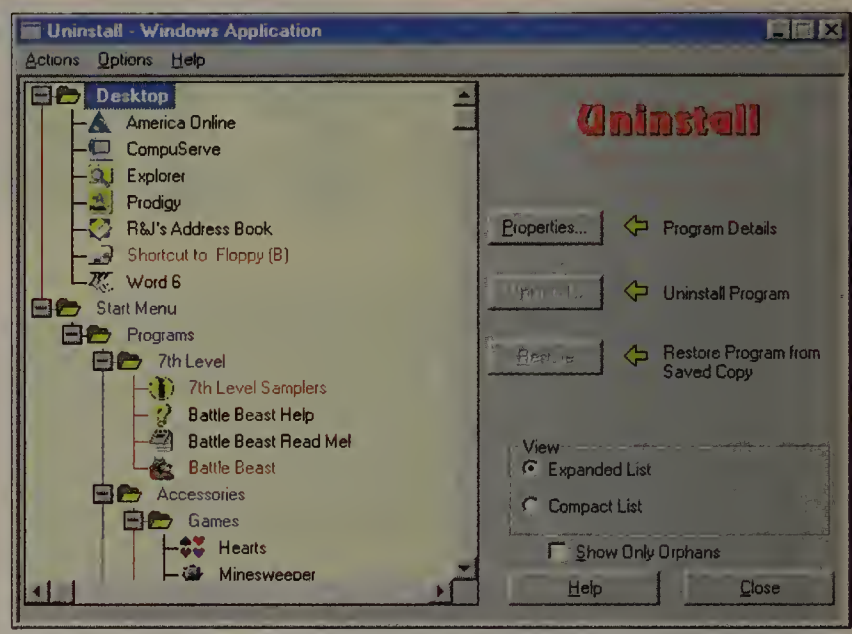
Version 4.0 includes an uninstall utility for removing unwanted programs (both 16-bit and 32-bit) from the hard drive, and a diagnostic utility that tests the performance of multimedia components. Its new Clean & Zip tool compresses and archives seldom-used files, freeing hard disk space. And all of WinCheckIt's tools work under both Windows 3.1 and Windows 95.

UnInstaller 3 is a simpler utility with one major function: It removes unwanted 32-bit and 16-bit applications and files from your hard drive. I used a prerelease version with Windows 95 and experienced no problems deleting both types of programs.

UnInstaller has other useful tools too. It can move programs to other drives or directories, as well as compress and archive rarely used applications. You can also configure UnInstaller to monitor the installation of other programs, making it easier to delete them later.

Street priced about $10 less than WinCheckIt 4.0, UnInstaller 3 can't compete with WinCheckIt's all-you-can-eat buffet of Windows utilities, but it's a good deal if you just want to zap unwanted apps.

—Jeff Bertolucci



WINCHECKIT 4.0'S UNINSTALL UTILITY uses a graphical tree to list applications, making it easy to delete or archive the unwanted ones.

WinCheckIt 4.0

A bevy of diagnostic utilities for Windows 95 and Windows 3.1 users.
TouchStone Software Corp.
800/531-0450, 714/969-7746
Street price: $39.95
Reader service no. 647

UnInstaller 3

Popular uninstall tool now deletes 32-bit programs.
MicroHelp, Inc.
800/777-3322, 770/516-0899
Street price: $29.95
Reader service no. 648

Business Planner Helps Organize Objectives

Anyone starting a business has numerous obstacles to overcome, but creating a solid business plan—essential for securing loans and backing—doesn't have to be one of them. Power Solutions' PlanMaker 2.0 can reduce the time, effort, and aggravation needed to create a good business plan.

PlanMaker is part tutorial, part productivity tool. I spent about an hour working through a sample plan to learn the program's logic. But once I was used to its methods, it was easy to organize a cohesive document of my own.

Using PlanMaker's Workbook feature, you form the underpinnings to your proposal, such as an introduction, short- and long-term objectives, and marketing analysis and strategy. Most of PlanMaker is laid out as a split screen, with the top half as a prompt that helps you answer questions in the bottom half. PlanMaker provides three sample plans—one for a retail business, one for a manufacturing business, and another for a professional service business. Once you've got your outline developed, you can move to Narrative mode and build your finished business plan.

Unfortunately, if you want a truly polished proposal, you'll have to use an external spelling checker (or a good old dictionary) because the $129 PlanMaker lacks its own. I looked at a shipping version of the product, which runs under Windows 3.*x* and Windows 95.

—Joe Peschel

PlanMaker 2.0

Easy-to-use business plan maker with helpful tutorial.
Power Solutions
800/955-3337
List price: $129
Reader service no. 649

"MOST BANG FOR THE BUCK."

(BUT DON'T TAKE OUR WORD FOR IT!)

PC WORLD BEST BUY

JUNE 1995 BYTE BEST OVERALL V.34 EXTERNAL MODEM

ProClass 288 LCD V.34

New Estimated Street Price: $359

PC WORLD June 1995
BEST BUY

- "the best combination of price, performance, features, and support"... way ahead of the pack."
- "best overall value in a V.34 modem."
- "the clear Best Buy in this roundup."

BYTE/NSTL LAB REPORT June 1995
BEST OVERALL

- "top honors in almost every aspect of our benchmarks."

EDITORS' Home Office COMPUTING PICK

COMPUTERWORLD I/S BRAND PREFERENCE 1994 BEST PRICE/PERFORMANCE

ProClass 288 MT V.34

New Estimated Street Price: $289

Practical Class 288 Mt II V.34

New Estimated Street Price: $199

HOME OFFICE COMPUTING Jan. 1995
EDITORS PICK AWARD

- "represents the cutting edge of today's telecommunications technology...and better priced."

PC MAGAZINE March 14, 1995

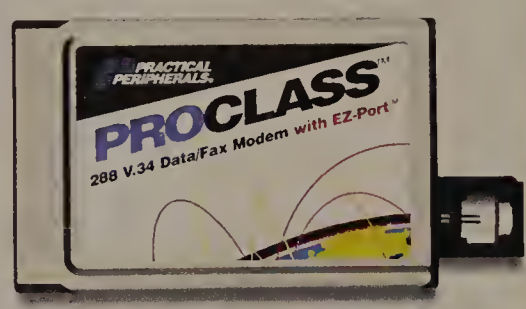
- "it's performance out distances even much more expensive modems."
- "by far a top performer overall."
- "best - performing modem."

COMPUTERWORLD I/S BRAND PREFERENCE 1994 BEST PRICE/PERFORMANCE

JUNE 1995 BYTE BEST OVERALL V.34 PC CARD MODEM

PCWEEK LABS ANALYST'S CHOICE DEC. 26, 1994

Mobile FIRST CLASS



ProClass 288 EZ-Port™

New Estimated Street Price: $289

PC WEEK April 3, 1995
ANALYST CHOICE

- "provided the most efficient built-in power management."
- "best combination of price and performance."

BYTE/NSTL LAB REPORT June 1995
BEST OVERALL

- "the modem ran extremely well, finishing first in our PC Card fax testing."

When it comes to value, industry editors and buyers think Practical. Our latest line of high-speed modems has been capturing all the awards, making Practical an incredible value. And with 7 day technical support and a lifetime limited warranty,* you will be very satisfied. For more information on the complete line of Practical modems, call PRACTIFAX at 800-225-4774 and select Document #3010, or call 800-964-2937, Ext. 600 for a dealer referral.

PRACTICAL PERIPHERALS®

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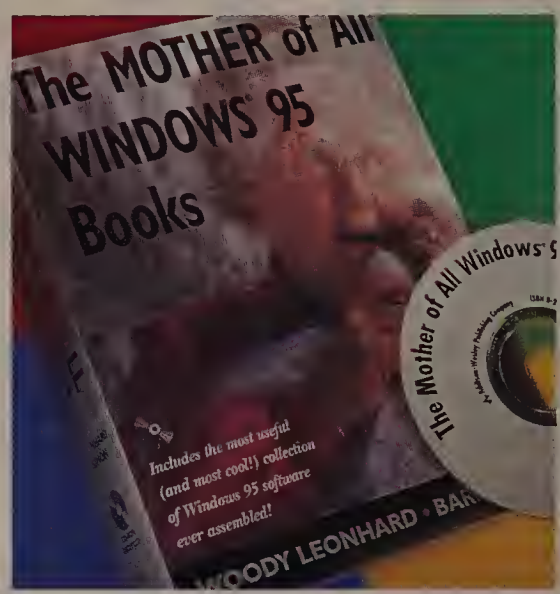
*Five year warranty on PCMCIA modems.

Circle 191 on reader service card

Mom Says Buy This Book and CD-ROM

Do you still have a sense of humor when it comes to Windows 95? *The Mother of All Windows 95 Books* does: This softcover book, with a CD-ROM bundled, balances wit and irreverence with useful information on the new operating system. It's a real bargain at $39.95, considering that the included CD-ROM provides some full commercial programs, as well as a bunch of shareware, freeware, fonts, and an icon collection.

Authors Woody Leonhard and Barry Simon boast considerable knowledge of Windows 95, while whimsical icon-size cartoon characters add occasionally useful tips and sarcastic asides. I laughed out loud as the characters seemingly hijacked the chapters. Central to all of this is Mom, a character straight out of a Jimmy Cagney gangster flick. Mom doesn't let Microsoft get away with anything, "even if the Justice Department will," she quips. As you read the tips, Mom or one of her cronies is sure to pop in and "give it to you straight."



MOM AND CRONIES give it to you straight in this fun and enlightening book and disc.

As for the CD-ROM, it's packed with a full version of ProCD's FreePhone with MapLinx (an 800-number directory and street finder); Official Airline Guide's FlightDisk airline schedule guide; and hundreds of shareware Windows 95 utilities, including antivirus, compression, and desktop tools.

For fun, you'll find 7th Level's Arcade America game and a sampler of children's games from Humongous Entertainment. There's a lot more on the CD-ROM, which itself is worth the price even without the book.

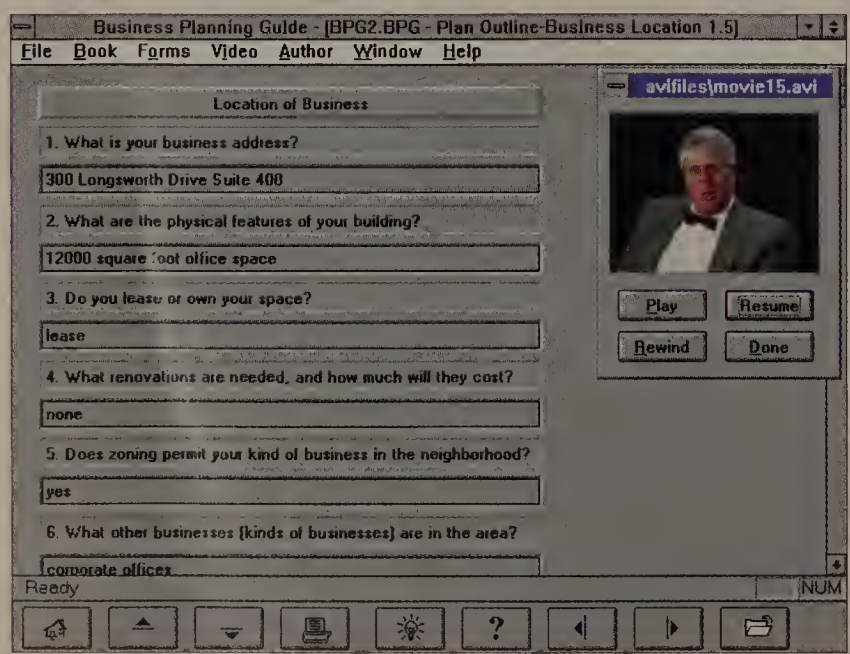
—Michael S. Lasky

The Mother of All Windows 95 Books

Entertaining softcover book plus free programs and utilities on bundled CD-ROM.
Addison-Wesley Publishing Co.
800/822-6339
List price: $39.95
Reader service no. 652

How to Succeed at Writing a Business Plan

A new business idea can spring from sweet inspiration, but before you raise a shingle the accountants must stamp their approval. The Business Planning Guide can help. This CD-ROM program for aspiring entrepreneurs isn't perfect, but for $19.95 it will help you create an organized, reasoned business plan that follows industry norms.



CONSTRUCT A WINNING BUSINESS PLAN with this CD-ROM, which provides advice and worksheet templates.

The Business Planning Guide shows how to construct worksheets that provide most of the material a bank wants, such as a three-year income projection, an analysis of potential competitors, and a list of required personnel. The disc includes a nicely executed multimedia help section and extensive video clips with tips on writing the plan and meeting the bankers. I found the program, which supports Windows 3.*x*, easy to use despite its drab-looking interface.

The software does have one notable drawback: It lacks a report writer to consolidate all the worksheets into a single document. You have to print the worksheets separately or export them to Microsoft Word. The program also lacks a mission statement form—usually a business plan's starting point.

Despite these omissions, The Business Planning Guide can help you get your idea off the ground.

—Ilan Greenberg

The Business Planning Guide

Inexpensive, expert help for writing a business plan.
Dearborn Financial Publishing Inc.
800/621-9621
Street price: $19.95, or $40 with softcover book
Reader service no. 653

KEVIN CANDLAND

Two guesses who just bought a Quantex.

intel inside pentium PROCESSOR

No, you're not seeing double. But you are seeing a dual reaction to getting a Quantex. It's the same reaction customers have been experiencing for years. One of confidence. Excitement. And the knowledge that they've just made one of the smartest buys since computers were invented.

You see, Quantex customers compare. Really compare. Not just price, but features and technology, too. And when they do, they discover dollar for dollar, feature for feature, Quantex can't be beat. When you compare and decide on a Quantex, you'll look pretty pleased, too. Who knows, maybe you'll find your smiling face in one of our ads.

Quantex Gives You The Best

YOU AND YOUR QUANTEX PC ARE A PERFECT PAIR.

SOME PEOPLE SAY that Quantex PCs seem to have a dual personality. On one hand, they're packed with cutting-edge technology, power, and features. On the other hand, they're aggressively priced to be gentle on your bank account. Which side reflects the "real Quantex?" Both of them.

From our high-performance multimedia machines to our potent workstations, our customers all agree: Quantex gives you more of what you want at an unbeatable value.

So shop around. Read the reviews. Compare us feature for feature and dollar for dollar with any other PC on the market. The more closely you look, the better you'll see. No one else can quite match up to Quantex.

OUR COMMITMENT WORKS TO YOUR ADVANTAGE.

At Quantex, your complete satisfaction is our number one priority. We've based our business around it. And while our company has evolved over the years, our focus has never wavered.

How do we do it? By sweating the details. We're working harder, day in and day out, to create a line of meticulously engineered, technologically advanced, fully-loaded and competitively priced PCs. From family multimedia systems to Pentium® Pro microprocessor workstations, we'll never compromise about putting performance into your hands. That attitude reaches into every facet of our company. You'll notice it in our people, in conveniences like our Internet homepage, and, of course, in our award-winning systems.

I'm into all the hottest features and top performance Quantex offers.

PLUG AND PLAY, THROUGH AND THROUGH.

Here's a tip from Quantex: when looking for a personal computer, you should be aware that even though a system loaded with Windows® 95 is Plug and Play *capable*, that doesn't mean that the *components* are Plug and Play. Fact is, most companies' components are not! And that can lead to difficult upgrading or even component incompatibility!

That's why, from monitors to motherboards to multimedia, every component that goes into a Quantex is Plug and Play compliant. With this assurance that everything is self-configuring, you'll never have to worry about setting jumpers or performing compatibility tests. It's just one more way Quantex makes it easier.

WINDOWS MAGAZINE "System Struts Speed to Spare: the Quantex QP5/133 SM-1 is the speed demon multimedia PC you've been looking for... the QP5/133 is so fast you'll expect to hear sonic booms even after launching bloated applications...it's the perfect blend of speed, functionality and potential..." (December '95).

PC WORLD "The Quantex QP5/133 SM-1 still delivers a whopping amount of computer for the money. It costs nearly $1000 less than its typical Pentium-133 competitor..." (November '95)

PCComputing Quantex QP5/100 SM selected Top Pick: Pricewise Direct System. "You can't get more for less. We checked" (November '95).

Designed for Microsoft Windows 95

Of Both Worlds

SOME PEOPLE LIKE TO JUDGE US BY THE COMPANY WE KEEP.

That's why we only work with products you know and trust from the best names in the business. Like Intel, Microsoft, Novell, Diamond Multimedia, Sony, Western Digital, MAG Innovision, Altec Lansing Multimedia, Ensoniq and Toshiba.

With components like these, you're guaranteed top-flight performance and maximum reliability. When it comes to quality, Quantex doesn't cut corners!

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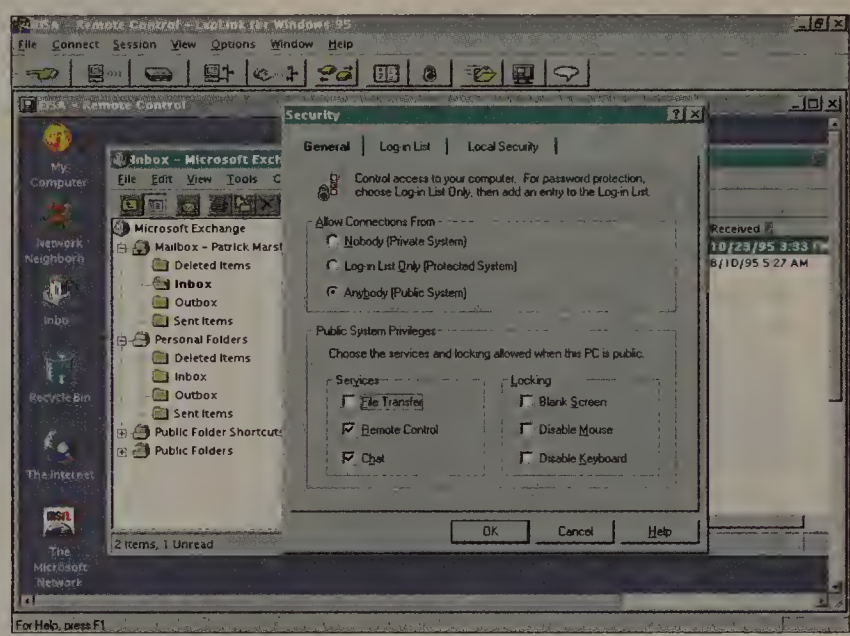
Circle 162 on reader service card

New LapLink Offers Easy Remote Control and File Transfer

While many programs have trouble living up to their names, LapLink has grown well beyond its moniker.

The program started out as a simple utility for transferring files between a laptop and a desktop computer. With version 6.0, introduced last year, Traveling Software added remote control to the powerful set of file transfer tools, and LapLink quickly became one of the top remote control packages. With the new 32-bit Windows 95 version, it's making a strong bid for honors as the best all-around remote control program on the market.



LAPLINK FOR WINDOWS' FILE TRANSFER TOOL: LapLink for Windows 95 offers a solid set of file transfer tools, including a utility for synchronizing directories between a notebook and a desktop.

Convenience Plus

As with its predecessor, LapLink 6.0, the best thing about LapLink for Windows 95 is its convenience. For example, although other remote control programs force you to launch either a host or guest module, with LapLink the same module works as both. This capability means less confusion and more convenience. Even better, while most programs require you to specify call types, LapLink now accepts calls via different modes—LAN, TCP/IP, modem, cable, and so forth.

In addition, LapLink for Windows 95 offers several important enhancements. For starters, installation and configuration are a breeze, since the program automatically detects what network protocols you have running, what type of modem you're connected to, and whether cable or remote access dial-up connections are available.

What's more, LapLink for Windows 95 supports Microsoft's TAPI, which allows you to share the communications port with other programs. For example, you no longer have to take LapLink out of Wait for Connection mode if you need to dial out to send a fax with another application. Programs that don't support TAPI monopolize the communications port and force you to shut them down before you can use another communications program requiring that port.

LapLink for Windows 95 adopts the Windows 95 interface, with tabbed dialog boxes, right-button mouse functionality, pop-up balloons, and support for long file names. And if you're using LapLink for Windows 95 to connect to LapLink 6.0 you'll find that translation between long and short file names takes place automatically and painlessly.

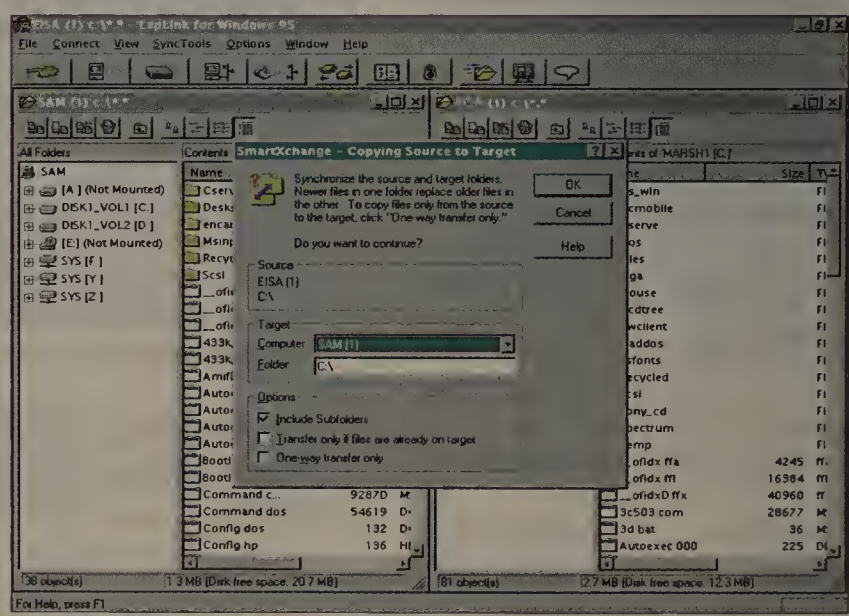
The beta software I evaluated hadn't been optimized for speed, but my testing of LapLink 6.0 showed it to be one of the fastest programs available, especially when it comes to moving files. And there's good reason to expect the 32-bit LapLink for Windows 95 to be faster yet.

Putting It in Perspective

Don't get me wrong: LapLink doesn't do everything. It lacks terminal emulations for making connections to online services, and unlike Symantec's pcAnywhere and Stac Electronics' ReachOut, it does not offer antivirus software for scanning files being transferred. Nor does LapLink provide handy features such as printer redirection, drive mapping, and session recording, all of which you'll find offered in pcAnywhere and ReachOut. (On the other hand, those programs lack LapLink's ability to make multiple connections and its ease of use.)

The bottom line is that if you don't require the handful of features Laplink lacks, you won't find an easier-to-use file transfer application than LapLink for Windows 95.

—Patrick Marshall



LAPLINK FOR WINDOWS 95's security dialog box makes it easy to restrict dial-in access to your computer.

LapLink for Windows 95

Easy-to-use remote control program is now available in an even easier-to-use, 32-bit Windows 95 version.

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WebCompass Organizes Searches—But Free Tools Do Nearly as Well

Quarterdeck's WebCompass 1.0 Internet search product offers some slick features and a glimpse of where this technology is heading. However, the package's limitations can make you painfully aware that the future is still far off. Until things improve, you may want to save your money and use the free search tools currently available on the World Wide Web.

WebCompass 1.0 resides on your hard disk and requires a graphical World Wide Web browser such as Netscape. The 32-bit program can run under Windows 95, Windows NT, or Windows 3.1 (using the provided Win32s extensions).

WebCompass has the power of existing Internet search engines but offers additional time-saving features. For example, while some free "meta" search sites on the Internet provide access to multiple search engines, you must type in your search criteria multiple times. But you only have to enter search criteria once with WebCompass, which simultaneously uses Yahoo, Lycos, and other engines to find your information. You can also add new search engines that you might find on the Internet.

In addition, WebCompass does a better job of organizing and summarizing its findings than other options. It presents URLs, Usenet messages, and other Internet resources in a categorized and annotated hypertext index.

Unfortunately, the shipping version I examined had frequent problems connecting to some of the designated search engines. On one occasion, it couldn't get through to Lycos, even though I was able to connect to Lycos on my own.

Another shortcoming is its skimpy, sloppy manual. I found several errors in its 24 scant pages, including the wrong path name to the program's home page. For now, you may want to stick with free alternatives, such as the superb All-in-One Search Page (**http://www.albany.net/allinone/**). This page provides easy access to multiple search engines, though you won't be able to use them simultaneously or create your own index. On the other hand, using it won't cost you a dime.

—Reid Goldsborough

WebCompass 1.0

Sophisticated Internet searching—but has some drawbacks.
Quarterdeck Corp.
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Internet Phone More Novelty Than Necessity

TELEPHONE ON THE NET: Store up to ten names in a push-button interface for quick Internet calls.

By now you've probably heard of Internet Phone, a program that lets you carry on voice conversations with Net users worldwide—all for the price of a local phone call. But unfortunately, most PC sound boards are *half-duplex*, meaning that the communication line is unidirectional. This limitation means you can either talk or listen during a call (like on a CB radio), but it won't be a natural conversation.

That's changing, however. IPC Peripherals' new CyberChat is one of a new breed of *full-duplex* sound boards that let Internet Phone users talk and listen concurrently. Street priced at about $140, CyberChat is a 16-bit stereo sound board that includes a copy of VocalTec's Internet Phone 3.0 software and a headset.

Installation is straightforward: Insert the sound board in an ISA bus slot, then load the CyberChat drivers and Internet Phone software. You'll need a 14.4- or 28.8-kbps modem and an account with an Internet service provider.

As a real-world business tool, the Internet Phone is more novelty than necessity. For instance, if you want to call a colleague in Boston or Bombay, the two of you will have to arrange a time beforehand to be online—this is hardly a spontaneous means of communication—and you'll both need a full-duplex sound card to converse. Internet Phone's audio quality also needs help. Working with a prerelease version of CyberChat and Internet Phone 3.0, I found the sound quality of my Net-based conversations to be inferior to those of most long-distance phone connections. But then I didn't have to pay toll charges.

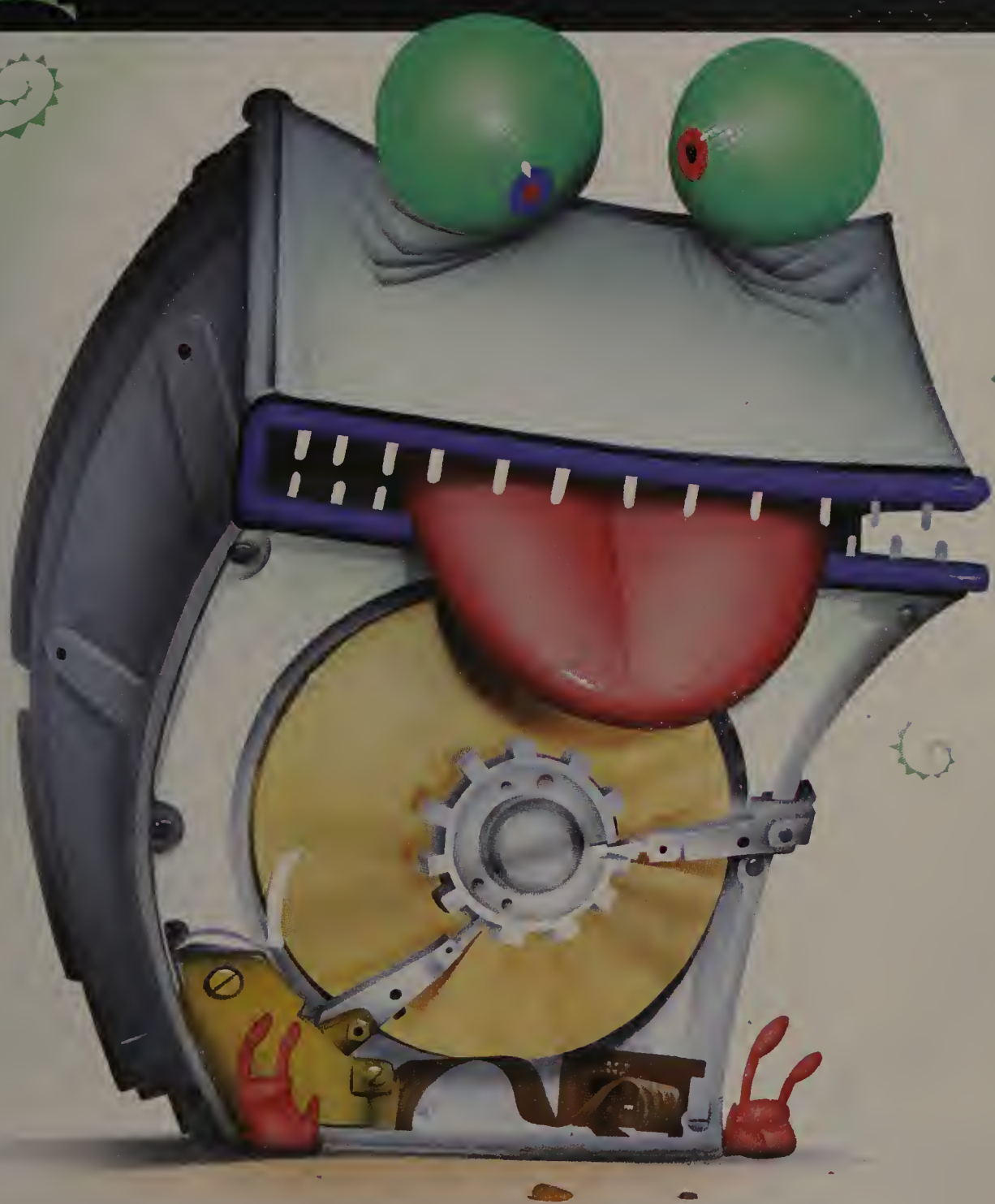
Unless you're a Net pioneer, you might want to wait a while before giving CyberChat and Internet Phone a ring.

—Jeff Bertolucci

CyberChat

Full-duplex sound board with Internet Phone software.
IPC Peripherals
510/354-0800, 510/354-0808 (fax)
Street price: $129.95
Reader service no. 672

It's What Keeps Your Gig Drive From Gagging.



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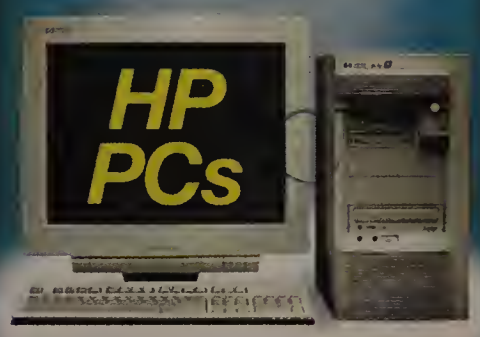

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Bargain Color Scanner

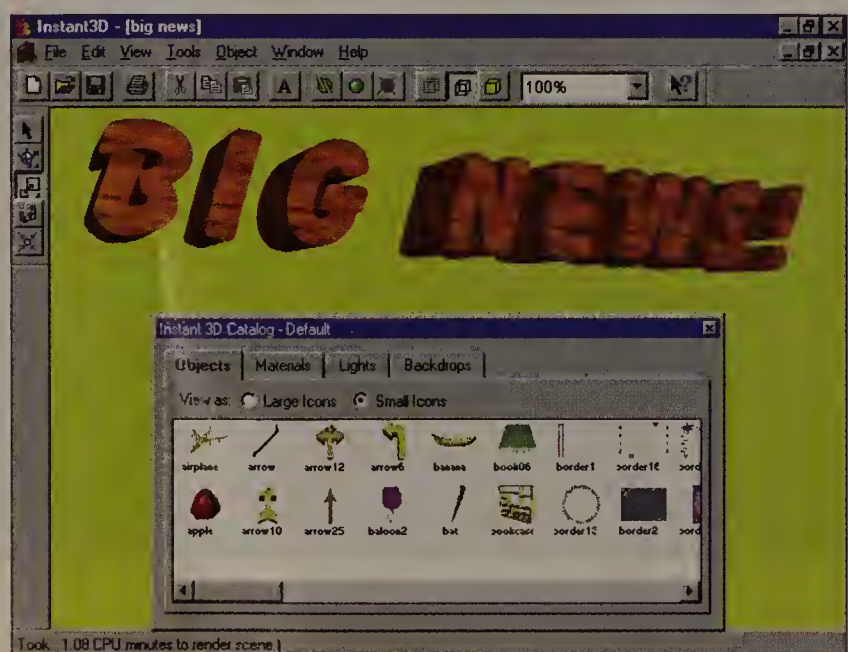
A flatbed color scanner works great, but buying one can put a dent in your bank account. Epson's $549 **Action Scanning System II** costs less than most products in its category. This 24-bit color scanner should be easy for beginners to use, and it doesn't skimp on quality. It supports 300-by-600-dots-per-inch resolution and up to 2400 by 2400 dpi with interpolation. Epson bundles optical character recognition software, image editing software, a utility that lets you use the scanner as a convenience copier, and a TWAIN driver. The unit attaches to your PC with an included bidirectional parallel interface board and cable. A final bonus: The scanner measures a compact 15 inches wide by 22 inches long by 8.6 inches high. Epson, 800/289-3776 ext. 3000.

SCANNING FOR GOLD: Epson's inexpensive Action Scanning System II is easy to use and offers a solid value for beginners.

See It in 3-D

Stop those yawns before they start: With **Instant 3D**, there's no excuse for flat, unexciting memos and presentations. Visual Software's $49 Instant 3D for Windows 95 lets you quickly and easily add pizzazz to documents. Thanks to the program's OLE 2.0 technology, you can create simple three-dimensional graphics without leaving your word processor or presentation program. This software lets you turn TrueType fonts into slick headlines and logos; apply color, texture, and lighting effects; then rotate your creations in 3-D space. For even easier special effects, the package comes with dozens of ready-made 3-D clip art objects. Ambitious artists who want to design their own models or create animation sequences will prefer Caligari's $99 trueSpace SE. Visual Software, 213/938-7600.

Reader service no. 654



3-D IN A HURRY: Instant 3D adds dimension to TrueType fonts and includes a collection of ready-made three-dimensional graphics.

Space to Spare

People stocking up on Windows 95 applications need plenty of hard drive space, and high-capacity devices like HP's **SureStore 1080A and 1600A** fit the bill. These 1GB and 1.6GB drives use an Enhanced IDE interface. Their average seek time is less than 12 milliseconds and their data transfer rate is 4.61 to 8.1 megabytes per second. The drives fit in 3.5- or 5.25-inch bays and come with a mounting kit and installation software. Street price is $220 for the 1080A, $285 for the 1600A. Hewlett-Packard, 800/826-4111.

Reader service no. 657

Good-Bye, Operator

If you don't want to shell out $150 for a CD-ROM phone directory, try **PC411**, an online directory service that offers more than 105 million residential and business listings from the United States and Canada. You don't need Internet access to use it; a modem and PC411's $15 starter pack will get you going. Just dial up the PC411 database, enter your search parameters (such as name, city, and state), and PC411 pulls up the names that match your criteria. You can search multiple area codes, states, and regions simultaneously. If a match is found, the cost is usually 50 cents per search. PC411, 800/243-8411.

Reader service no. 655

Organize Business Cards

Seiko's **Smart Business Card Reader** scans in up to four business cards per minute in either landscape or portrait orientation. We were impressed with this product: In informal testing, it proved significantly more accurate than the $299 CardScan Plus PP from Corex Technologies. Seiko's 400-dpi device enables you to put contact information into searchable electronic format, using OCR technology designed for business cards. You can view images of whole cards, view a searchable list of contacts, or export information to popular contact managers. The compact unit measures only 7.5 by 4.25 by 2.75 inches and occupies little desktop space. The expected street price is $199. Seiko Instruments USA, 800/688-0817, 408/922-5900.

Reader service no. 659

For more information about any product, contact the manufacturer or circle the number on the reader service card.

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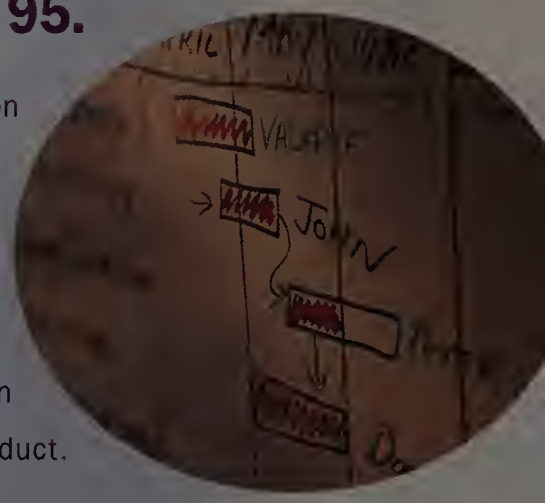
to guide
your project down a clear path

Microsoft Project for Windows 95.



Now you can manage projects more simply, more smoothly, by communicating project information as it occurs. With Microsoft® Project you can convey project status quickly and effectively so your boss, customers, and coworkers are always in the loop. From sharing task deadlines and responsibilities, to letting people know about changes and the impact they'll have on the deadline, you have the tools to organize your projects into manageable steps and keep them moving in the right direction. Microsoft Project unlocks the doors of communication and gives you the power to navigate the most efficient route to a successful end product.

Graphical views let teammates visualize where the project is going.

With Microsoft Project you can display project data in ways that everyone can understand. Great-looking Gantt Charts integrate text, timelines and graphical bars so everyone can see start and finish dates, interdependencies and task assignments. Throughout your project, you can also use a Monthly Calendar report to share your plan in a format that's clear and easy to read. And since Microsoft Project shares many of the same key commands with other Office applications, it will be easy to create schedules and reports. But if at any time you need help, type in a question and the Answer Wizard gives you the information you need. Microsoft Project helps you illustrate every phase of your project so you and your team keep your goals in sight.

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Keep everyone moving on the same track with open lines of communication.

Microsoft Project is completely integrated with a wide range of e-mail systems* and Schedule+ so that with a single click, changes and additions are immediately distributed to and from teammates. Assignments, task changes, and progress can be communicated and updated without ever reentering information, so you save time and eliminate mistakes. And because Microsoft Project is a member of the Office family, sharing data between programs is easy. For example, you can start building a schedule by simply dragging a task list out of Microsoft Excel and dropping it directly into your Microsoft Project plan. You keep communication clear and information consistent and your project continues to move exactly the way you planned.

Now you can take full advantage of Windows 95.

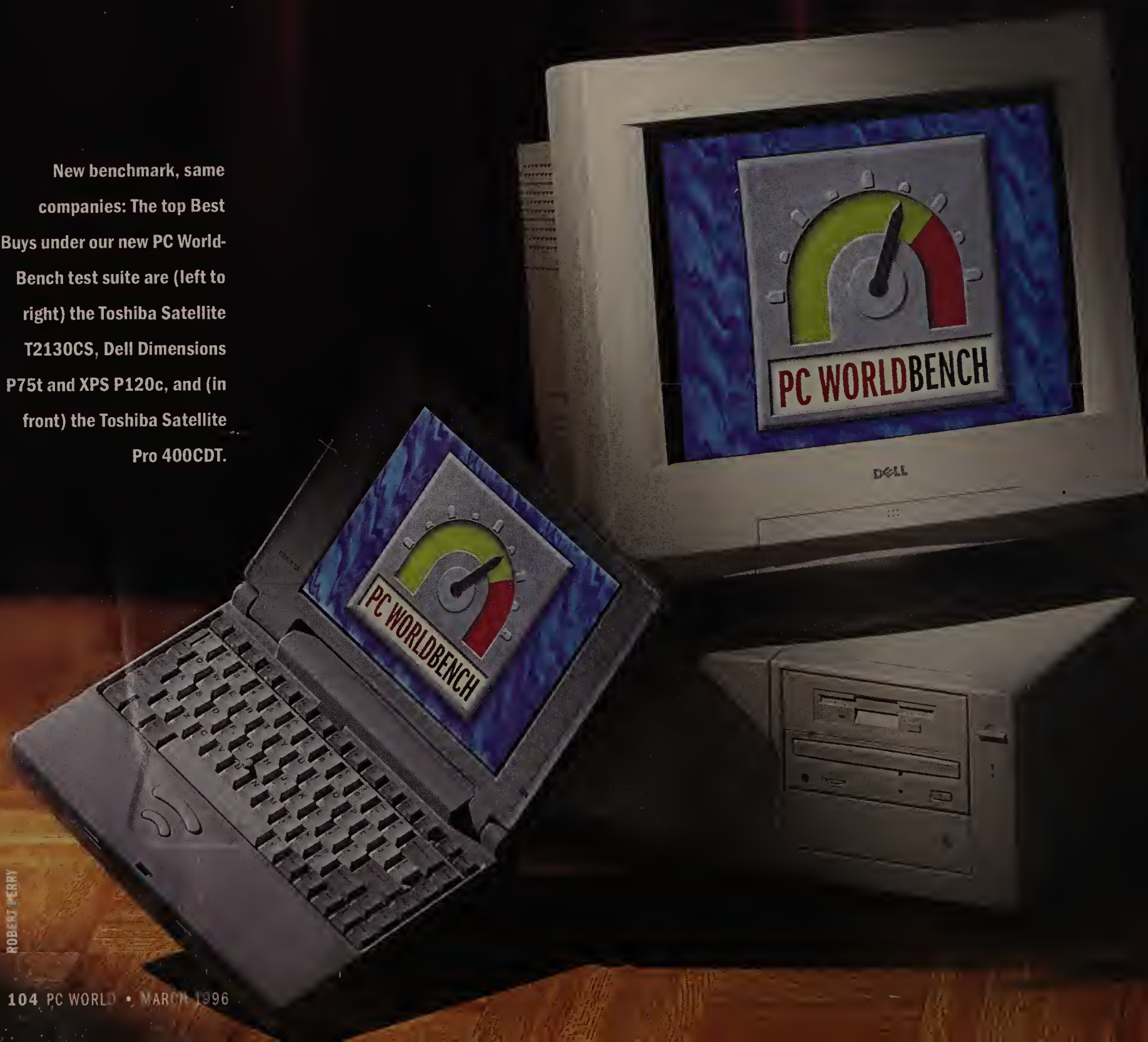
Microsoft Project is the world's best selling project management software and now is optimized to work hand-in-hand with the 32-bit performance, advanced multitasking, and simplified user interface of the Windows 95 operating system. Together, they help open the lines of communication. Together, they help you enhance the way you manage your projects.

TOP 20 PCs

BEST PCs *for*

Introducing PC WorldBench, the first Windows 95–based test suite,

LIKE IT OR NOT, WINDOWS 95 IS TAKING OVER THE DESKTOP. MOST CONSUMER systems come with it preinstalled, and eventually most business machines may, too. Wouldn't it be nice if you had an updated list every month of the best Windows 95 desktops and notebooks out there? Well, now you do. In this issue, we break the



New benchmark, same companies: The top Best Buys under our new PC WorldBench test suite are (left to right) the Toshiba Satellite T2130CS, Dell Dimensions P75t and XPS P120c, and (in front) the Toshiba Satellite Pro 400CDT.

ROBERT PERRY

WINDOWS 95

and our new lineup of Top 20 desktops and notebooks for Windows 95.

proverbial champagne bottle over our new Top 20 benchmark: PC WorldBench version 1.0, the first Windows 95–based test suite for assessing PC performance. Like our old benchmark test, PC WorldBench puts real applications through their paces to test a PC's speed. But now we've

By PC World Staff

THE TOP 20

Power pg. 108
Budget pg. 118
Notebooks pg. 126

added popular Windows 95 apps to create a more typical mix of software. By summer, we plan to make PC WorldBench available free of charge to anyone who wants it. (For more details, see *In This Issue.*)

Because of our rebuilt suite, we tested —and retested—over 160 desktops and notebooks. Too many variables (in both our scripts and the machines) shifted to allow hard comparisons to previous Windows 3.1 speed numbers. But one trend did emerge: Performance gaps between CPUs changed considerably. Under Windows 3.1, the gap between a Pentium-75 and a Pentium-133 was 43 percent, with jumps between interim processors averaging about 12 percent. Under Windows 95, the speed difference between a P-75 and a P-90 alone is 44 percent, with P-100s, -120s, and -133s performing much closer to one another than before. Either the processing demands of Windows 95 hit P-75s hard, or vendors are focusing on fine-tuning their high-end systems. In any case, if you're moving up from a P-75, consider going to at least a P-120.

The amount of RAM and secondary cache made a big difference. The PCs with the most of each were among our fastest; the next quickest were those with less cache; and those with the least of each turned in the worst results. The most puzzling change was in battery life. All but two previously tested notebooks have shorter battery life, some several hours less. We're investigating why.

PC WorldBench: A Number You Can Identify With

We figured a groundbreaking test suite like PC WorldBench deserved some numbers that make more sense than our old way of scoring performance. So in this issue we make a big change in how we present our speed results. For the first time, we compare all tested machines to a baseline PC—Dell's P75t, a Pentium-75 minitower with 8MB of RAM, a 540MB hard drive, and no secondary cache. We gave this system a speed score of 100, with the scores for all other PCs calculated in relation to it.

We chose a Pentium-75 desktop for our baseline because it is rapidly becoming the Volkswagen of computers: no longer terribly flashy, but solid, reasonably priced, and still fast enough for the average user. We chose Dell's Pentium-75 in particular because it's a high-quality machine made by a respected manufacturer. By assigning the P75t a WorldBench score of 100, we've made it easy for you to see how other PCs on the charts—both desktops and notebooks—fare in relation to the P75t and one another. A system that scores 150, for instance, is 50 percent faster than the Dell. One that scores 82 is 18 percent slower. Any PC that scores around 100 is a good system for fairly basic Windows 95 processing—with two or three business applications open at most. But if you need to do CPU-intensive work (with graphics applications or CAD, for instance), look for more—the higher the WorldBench number the better.

Plus Ça Change...

Many systems that excelled this month are the same ones that did well under our Windows 3.1–based tests. Perennial overachievers Dell and Micron still come out on top on the Power Desktops chart, thanks to their winning combinations of performance, price, features, and support. The $2969 Dell Dimension XPS P120c—a fast, nicely appointed P-120 minitower propelled by lots of secondary cache—is back as number one on the Power Desktops chart. Dell hangs on to the top spot on the Budget Desktops chart as well, where the Dimension P75t Pentium-75 compact replaces a discontinued Dell P-90, the Dimension XPS P90. The Pentium-90 is a popular CPU in high-end notebooks, but vendors are phasing it out of their desktops—only one now remains on our lists: Quantex's number 19 budget machine, the QP5/90 M-4.

On both power and budget notebook charts, Toshiba is our top choice, with Dell close behind. The Toshiba Satellite Pro 400CDT, an expensive but reliable Pentium-75 with good battery life and great features, including an internal CD-ROM drive, grabs the top spot on the power notebook list. Dell gets pushed aside again on the budget chart, where the new Toshiba Satellite T2130CS, a fast, inexpensive DX4-75, breaks the Latitude LX 4100D's four-month reign as the number one Best Buy.

Compaq made a big showing on our Power Desktops chart, with five new Pentium-100, -120, and -133 systems landing in the lower half. All have Compaq's high-quality design and construction and its top-notch service and support policies, but high prices or below-average speed kept them from placing higher. New machines based on Intel's 166-MHz Pentium chip continue to trickle onto our Power Desktops chart, including Digital's Celebris GL 5166 and Dell's Dimension XPS P166c, which debut in eighth and ninth place, respectively. The $4469 XPS P166c is more than twice as fast as the number one budget desktop, Dell's P75t—it's the fastest PC we've tested to date.

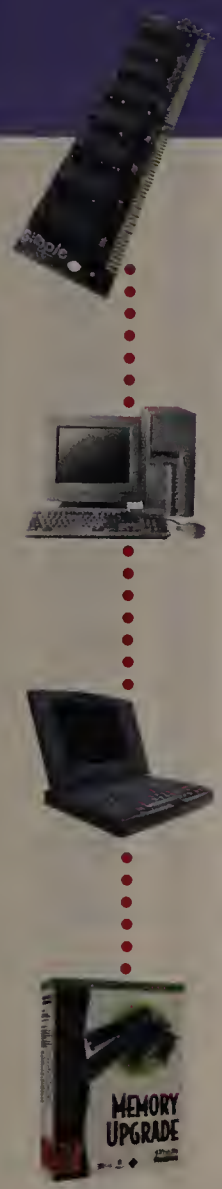
Resetting Priorities

Despite top rankings similar to February's, none of the ratings numbers in this month's Top 20s can be compared to those in prior months. In addition to testing with a different operating system and test apps, we altered our weightings slightly, making price a little more important for power PCs than before, and reliability just as important for a budget PC as for a high-priced one. We also adjusted the scale on which the performance **continued on pg. 138**

PC World *staff members Bryan Hastings, Tracey Capen, John Goddard, Brad Grimes, Eric Hellweg, Arden Hoffman, Melissa Riofrio, and Carla Thornton, and freelance writers Geoff Coffey, Jon L. Jacobi, Owen Linderholm, and Jim Martin contributed to this article. Testing by Dave Casini, Ulrike Diehlmann, Andrew Hawn, Jeff Kuta, and Mike Salayko, with additional support by Julian Weatherby and testing assistance by Dave Bronsen, Stephen Hassett, Sharyl Loggins, and Derek Sakai. Research by Ann Cassidy.*

For more information about all products in this article, please circle reader service no. 911.

Running out of memory can stop you in your tracks.



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THE PC WORLD TOP 20

POWER DESKTOPS

1 **Dell Dimension XPS P120c**
Affordable and loaded.

	Last month	Months on chart	First reviewed	Overall rating[1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Dimension XPS P120c	3	7	Sep 95	89	177	75/76	$2969	Pentium-120	16	1080
2 Micron P133 Millennia	2	8	Aug 95	89	182	78/70	$3099	Pentium-133	16	1624
3 Dell Dimension XPS P133c	1	5	Nov 95	88	193	75/76	$3349	Pentium-133	16	1080
4 Micron P166 Millennia Plus	8	2	Feb 96	87	198	78/70	$4796	Pentium-166	16	2150
5 Micron P120 Millennia	4	10	June 95	87	171	78/70	$2899	Pentium-120	16	1275
6 Dell Dimension XPS P100c	10	8	Aug 95	87	174	75/76	$2799	Pentium-100	16	1080
7 Micron P100 Millennia	6	8	Aug 95	86	168	78/70	$2799	Pentium-100	16	1200
8 Digital Celebris GL 5166	–	1	current	86	188	79/76 [3]	$4528	Pentium-166	16	1624
9 Dell Dimension XPS P166c	–	1	current	86	208	75/76	$4469	Pentium-166	32	1080
10 HP Vectra VL 4 5/133	5	2	Feb 96	85	181	82/76 [3]	$3900	Pentium-133	16	1080
11 Compaq ProLinea 5120	–	1	current	84	169	77/76	$2776	Pentium-120	16	1080
12 NEC PowerMate P-133	7	2	Feb 96	83	185	74/70 [3]	$2999	Pentium-133	16	1624
13 Compaq DeskPro XL 5133	–	1	current	82	173	77/76	$4698	Pentium-133	16	1083
14 Compaq ProLinea 5100	–	1	current	81	161	77/76	$3386	Pentium-100	16	1080
15 Compaq DeskPro 5133	–	1	current	81	161	77/76	$4198	Pentium-133	16	1037
16 Gateway 2000 P5-133	–	1	current	80	186	67/71	$2799	Pentium-133	16	1650
17 Gateway 2000 P5-120	10	2	Dec 95	79	176	67/71	$2499	Pentium-120	16	1084
18 Compaq DeskPro 5100	–	1	current	79	155	77/76	$3138	Pentium-100	16	1033
19 PerComp P150 Professional	–	1	current	78	187	[3]	$2899	Pentium-150	16	1624
20 DTK Quin 54M/P133	15	4	Dec 95	78	152	74 [3]/65 [3]	$2990	Pentium-133	16	1033

BEST BUY

[1] Percent contribution to overall rating: performance (25); price (15); features (20); reliability (25); service and support (15).

[2] Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for telephone billing) to order fax copies of system reviews. You can order an entire month's review ($9.95) and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95; available February 22). Touch-tone phone required.

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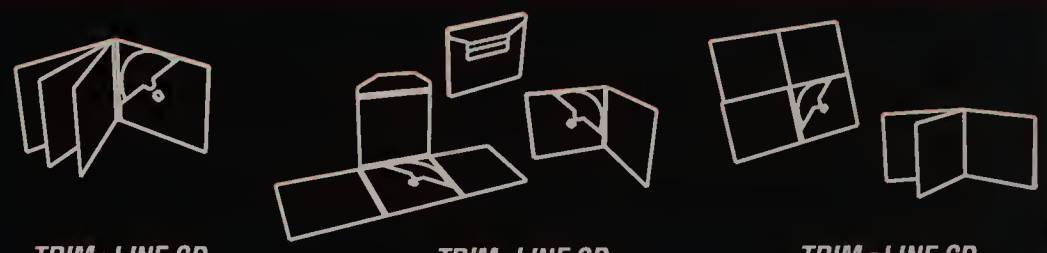

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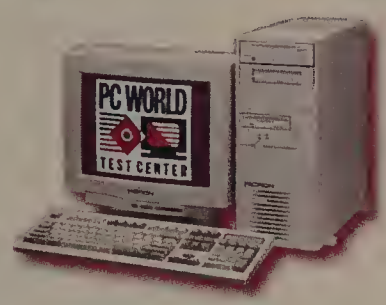
2 **Micron P133 Millennia**
Great all-around package.

3 **Dell Dimension XPS P133c**
Excellent performance and features.

4 **Micron P166 Millennia Plus**
A top performer.



5 **Micron P120 Millennia**
Price is right.

	CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Reader service no.	Comments[2] Recommended as home system
	4X	ISA, PCI	17"/.28	800/613-3355	713	No. 1 system lets you have it all: power, reasonable price, nice features, excellent support.
	4X	ISA, PCI	15"/.28	800/223-6571	714	Fast; nice price, features, and support.
	4X	ISA, PCI	17"/.28	800/613-3355	715	Big monitor, very fast, great support, fast 28.8-kbps modem, affordable.
	6X	ISA, PCI	15"/.28	800/223-6571	716	Only the Dell P-166 is faster, and this unit has a huge hard drive.
	4X	ISA, PCI	15"/.28	800/223-6571	717	Solidly configured, low price, company has very good reputation for system reliability.
	4X	ISA, PCI	17"/.26	800/613-3355	718	Low price, very fast for a P-100, roomy screen great for viewing spreadsheets.
	6X	ISA, PCI	15"/.28	800/223-6571	719	Decent speed, nice price, very fast CD-ROM drive.
	4X	ISA, PCI	15"/.28	800/722-9332	720	Expensive, but excellent performance and has a big hard disk.
	6X	ISA, PCI	17"/.28	800/613-3355	721	Pricey, but the fastest desktop you can buy.
	4X	ISA, PCI	17"/.28	800/322-4722	722	Expensive, but nice features, and from a company that's tops for system reliability.
	—	ISA, PCI	17"/.28	800/345-1518	723	Attractive price, monitor has spacious screen, but PC is slow for a power system.
	6X	ISA, PCI	15"/.28	800/632-4636	724	Nice price for speedy PC with fast CD-ROM drive and a big hard drive.
	4X	EISA, PCI	15"/.28	800/345-1518	725	Solid machine, but you pay extra for network features such as an EISA bus.
	—	ISA, PCI	17"/.28	800/345-1518	726	You pay a pretty price for what you get, but you can count on Compaq's reliability and service.
	4X	ISA, PCI	17"/.28	800/345-1518	727	Less expensive than its more network-oriented XL sibling (no. 13), but still pricey.
	4X	ISA, PCI	17"/.26	800/846-2000	728	A lot of machine for the price, but Gateway lags a bit in service and system reliability.
	4X	ISA, PCI	15"/.25	800/846-2000	742	Very inexpensive for a P-120 desktop, reasonably fast. Only power system on Budget chart, too.
	—	ISA, PCI	15"/.28	800/345-1518	730	Expensive for what you get, but very good service and reliability rating.
	6X	ISA, PCI	17"/.26	800/856-6688	731	Sole P-150 on chart has P-133 speed, but is inexpensive.
	6X	ISA, PCI	15"/.28	800/289-2385	732	Inexpensive, but slowest PC on chart; fast CD-ROM is only outstanding feature.

[3] We received fewer than 100 Reliability and Service Monitor responses for this company. Its ratings are based on a combination of responses for it and the average for all companies for which we received 20 to 99 responses. If we received fewer than 20 reliability or service responses for a company, no score appears.

For more information about all products in this table, circle reader service no. 908.

Top 20 Power Desktops

1 Dell Dimension XPS P120c

REVIEWED: September 1995

PROS: Good performance, 512K of secondary cache, great support

CONS: None significant

Even before we retested and rereviewed systems using the new Windows 95–based PC WorldBench tests, it was a safe bet that this leading member of the Dell Dimension family would do well. This minitower was the fastest Pentium-120 we tested this month, due in part to its larger-than-usual 512K of secondary cache. Performance and features are augmented by a laundry list of other great components: 16MB of Extended Data Out (EDO) RAM, a 1080MB hard drive, a quadruple-speed CD-ROM drive, a 17-inch Dell monitor, a Number Nine 9FX Motion771 video board with 2MB of VRAM, and a 28.8-kbps fax-modem, as well as 16-bit sound.

Dell XPS P120c

There is reasonable room for growth, with two free externally accessible drive bays and four free expansion slots. Dell's stellar support package includes a three-year warranty. And getting all this for a downright affordable $2969 makes this high-powered desktop system a knockout Best Buy.

2 Micron P133 Millennia

REVIEWED: August 1995

PROS: Good expandability, bundled Microsoft Office Professional

CONS: None significant

The Micron P133 Millennia is an average performer for its processor class, much faster than DTK's Quin 54M/P133, but not as fast as some other Pentium-133s, such as Dell's number three Dimension XPS P133c. For $3099 you get 16MB of fast EDO RAM, a roomy 1624MB SCSI hard drive, a quad-speed CD-ROM drive, and an ADI MicroScan 4V 15-inch monitor. The only thing missing from this otherwise complete setup is a modem, a requirement if you want to send and receive e-mail or browse Web sites on the Internet.

Micron P133

The interior of this compact is well laid out—the SIMM sockets are the most accessible you'll ever see. Micron's spectacular new online Windows help is indeed helpful, with photos and even videos of basic hardware maintenance tasks. And the company's new warranty is especially robust: It covers the CPU and main memory for five years and the rest of the system for three years.

3 Dell Dimension XPS P133c

REVIEWED: November 1995

PROS: Good performance, 512K of secondary cache, 17-inch monitor, great support

CONS: None significant

Predictably, last month's top Best Buy doesn't move far from its former spot. Apart from its faster modem and 2MB of graphics RAM, this Pentium-133 system is configured essentially the same as its 120-MHz sibling but gives you terrific P-133 performance—the best on the chart. The highlights of the P-133 model are its 16MB of fast EDO RAM, 1080MB hard drive, quad-speed CD-ROM drive, and 28.8-kbps fax-modem, plus Dell's strong support, which is highlighted by 24-hour, seven-day-a-week toll-free technical support and a three-year warranty.

Dell XPS P133c

4 Micron P166 Millennia Plus

REVIEWED: February 1996

PROS: 2150MB SCSI hard drive, 1GB Iomega Jaz removable cartridge drive

CONS: Expensive

Welcome to one of the fastest desktops on the planet. While Micron's P166 Millennia Plus can't quite keep up with Dell's Dimension XPS P166c, it blows by everything else out there. Not only that, but this $4796 minitower is bursting with extras. Inside the ordinary exterior you get a 2150MB SCSI-2 hard drive, a Plextor 6X CD-ROM drive, and an Iomega Jaz SCSI-2 removable cartridge drive that takes 1GB cartridges (about $100 apiece)—itself as fast as a good hard drive. The SCSI adapter supports the new Ultra-SCSI standard for future high-speed SCSI devices. The rest of the PC is equally impressive: 16MB of fast EDO RAM, a 15-inch Micron 15FGx monitor, and a Diamond Stealth64 video board with 2MB of VRAM.

Micron P166

5 Micron P120 Millennia

REVIEWED: June 1995

PROS: Good performance, excellent expandability, great software bundle

CONS: None significant

The $2899 P120 Millennia is a faster, slightly more expensive version of Micron's P100 Millennia, with a few differences. This Pentium-120 computer is reasonably quick, placing midpack in our Power Desktop Top 20. The system is configured with 16MB of RAM, a roomy 1275MB hard drive, a Diamond Stealth64 graphics accelerator card with 2MB of VRAM, a Creative Labs Vibra 16 sound card, and a 15-inch Micron 15FGx monitor. But it comes with a quad-speed CD-ROM drive, whereas the P100 has a 6X drive, and it lacks a modem as well. The minitower case has

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Micron P120

decent expansion, with two free externally accessible drive bays and a total of five free slots. As with all Millennias, the P120's processor and memory are covered for five years, and the rest of the system is covered for three years. In addition, the company scores very well in our ongoing reader fax-back survey for system reliability and service. In short, Micron covers all the bases with this Best Buy.

6 Dell Dimension XPS P100c

REVIEWED: August 1995

PROS: Great performance, top-notch service

CONS: No sound

A perennial selection in our Top 20 charts, the Dimension XPS P100c shows no signs of dropping off. You get a Pentium-100 processor, a 1080MB hard drive, 16MB of RAM, a quad-speed CD-ROM drive, and full-motion video—all for only $2799. It's very fast for a P-100, and the minitower case is roomy. The system is rounded out by a 17-inch monitor and is backed by Dell's superlative support and three-year warranty.

7 Micron P100 Millennia

REVIEWED: August 1995

PROS: Good performance, multimedia, bundled Microsoft Office Professional

CONS: None significant

This P-100 minitower has plenty of expansion room and is almost as fast as a P-120. At $2799 it's a good value, especially when you consider its powerful configuration, which includes a 1200MB hard drive, a 2MB Diamond Stealth64 Video graphics card, a Sound Blaster AWE32Lite sound card, and a 6X CD-ROM drive. Besides having the same extensive warranty as the P133 Millennia, the P100 (and all its siblings) comes with Microsoft Office Pro.

8 Digital Celebris GL 5166

NEW THIS MONTH

PROS: Great warranty, integrated sound and video, nice software package

CONS: Expensive; slow for a P-166

This pricey $4528 minitower is the slowest of the P-166s we tested this month with our new Windows 95 benchmarks, but that's like winning only a million dollars in the lottery—this PC is still a scorcher. Besides a typical 16MB of RAM, the Celebris boasts a spacious 1624MB hard drive, a quad-speed CD-ROM drive, and a built-in ethernet adapter, with the only disappointment being the unexceptional 15-inch monitor. The Matrox MGA controller with 2MB of WRAM and the 16-bit Sound Blaster–compatible sound chip are integrated on the motherboard, as is a SCSI adapter, which leaves lots of room for expansion. Digital's warranty and service policies are generous, but the toll-free phone support is available only on weekdays.

9 Dell Dimension XPS P166c

NEW THIS MONTH

PROS: Fastest PC you can buy, 6X CD-ROM drive, 32MB of EDO RAM, wavetable sound card

CONS: Expensive

As you might expect of a cutting-edge machine, Dell's first 166-MHz Pentium, the $4469 Dimension XPS P166c, packs more of everything. Inside, this compact desktop system has 32MB of EDO RAM, 512K of secondary cache, a 1080MB hard drive, a 28.8-kbps fax-modem, an AWE32 wavetable sound card, an Imagine128 video card with 4MB of VRAM, and a 6X CD-ROM drive. Overall, it's a tremendous PC—the fastest we've ever reviewed, and backed by excellent documentation and great service.

10 HP Vectra VL 4 5/133

REVIEWED: February 1996

PROS: Good performance, 3-D acceleration, tops for reliability

CONS: High price, limited expandability

For $3900, the Vectra VL 4 5/133 comes loaded with 16MB of RAM, a 1080MB hard drive, a quad-speed CD-ROM drive, a 17-inch HP Ultra VGA D2817A monitor, and a 2MB Matrox MGA Millennium graphics card. The Millennium features the added bonus of built-in 3-D acceleration for 3-D modeling and low-end CAD. This Pentium-133 is backed by Hewlett-Packard's superb system reliability and service. You also get a full three-year warranty and top-notch documentation. Aside from the high price, the only complaint we have is limited expandability.

11 Compaq ProLinea 5120

NEW THIS MONTH

PROS: Good quality, highly expandable

CONS: Sluggish; no sound card, fax-modem, or CD-ROM drive

The $2776 ProLinea 5120 comes with 16MB of RAM, a 1080MB hard drive, 256K of secondary cache, and a 17-inch monitor. There's tons of room for à la carte expansion, due to a total lack of multimedia: no CD-ROM drive, no sound card, no fax-modem. The ProLinea 5120's performance on our PC WorldBench test suite was below average for a Pentium-120. However, Compaq ranks well above average in our reliability and service surveys.

12 NEC PowerMate P-133

REVIEWED: February 1996

PROS: SCSI-based 6X CD-ROM drive, huge hard drive

CONS: Hard-to-reach floppy eject button

NEC's latest is a class act. For $2999 you get a very fast system with 16MB of EDO RAM, a 1624MB hard drive, an NEC 6X SCSI CD-ROM drive, and a 2MB S3 Trio64–based video board.

NEC also provides its own 15-inch NEC MultiSync monitor, and there's plenty of room to add more components. Our only quibble: The floppy drive eject button is hard to reach. NEC gets good marks in our reliability and service surveys and backs its systems with a three-year warranty and around-the-clock support.

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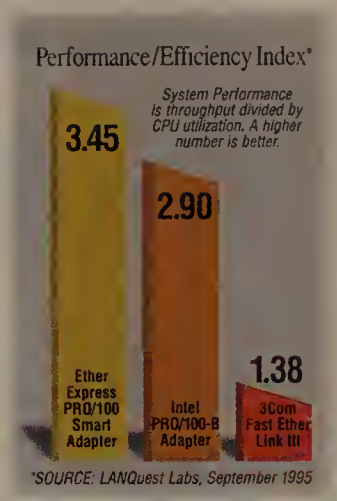

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No surprise that *PCWeek* showed power problems such as blackouts, brownouts, and surges accounted for almost as much data loss as all other factors combined, or that a leading accounting firm attributed the largest single cause of computer downtime to—you guessed it—bad power.

MULTI-TASKING MULTIPLIES YOUR RISK OF *"THE BIG ONE"*

Multi-tasking operating systems like Windows 95 and Windows NT Workstation let you open and manipulate multiple files and applications at the same time. That's why, unfortunately, as *PC Magazine* says "When Windows 95 does crash, it's a horrible mess..."

Moreover, if you are "wired" to the Internet, an on-line service, or dialing into the office, you'll discover that phone lines are common paths for surges taking the express route direct to your motherboard.

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In short, if you still don't have proper protection (that $5 surge strip doesn't count) it's time to protect yourself before you kick yourself. Experts agree: If you choose not to decide on proper protection now, the next time you see this ad may be too late.

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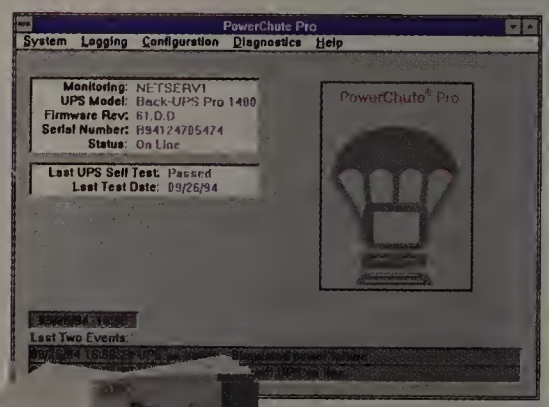

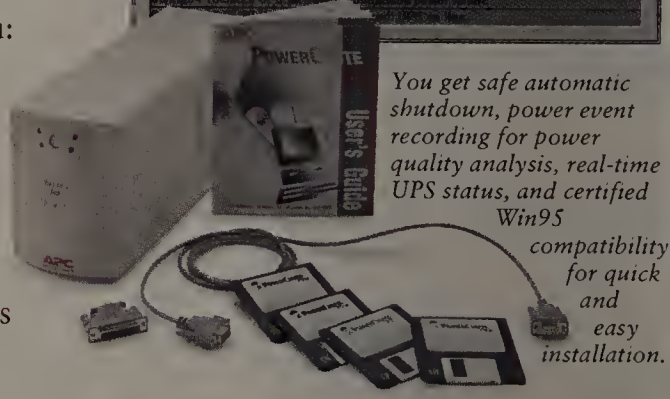

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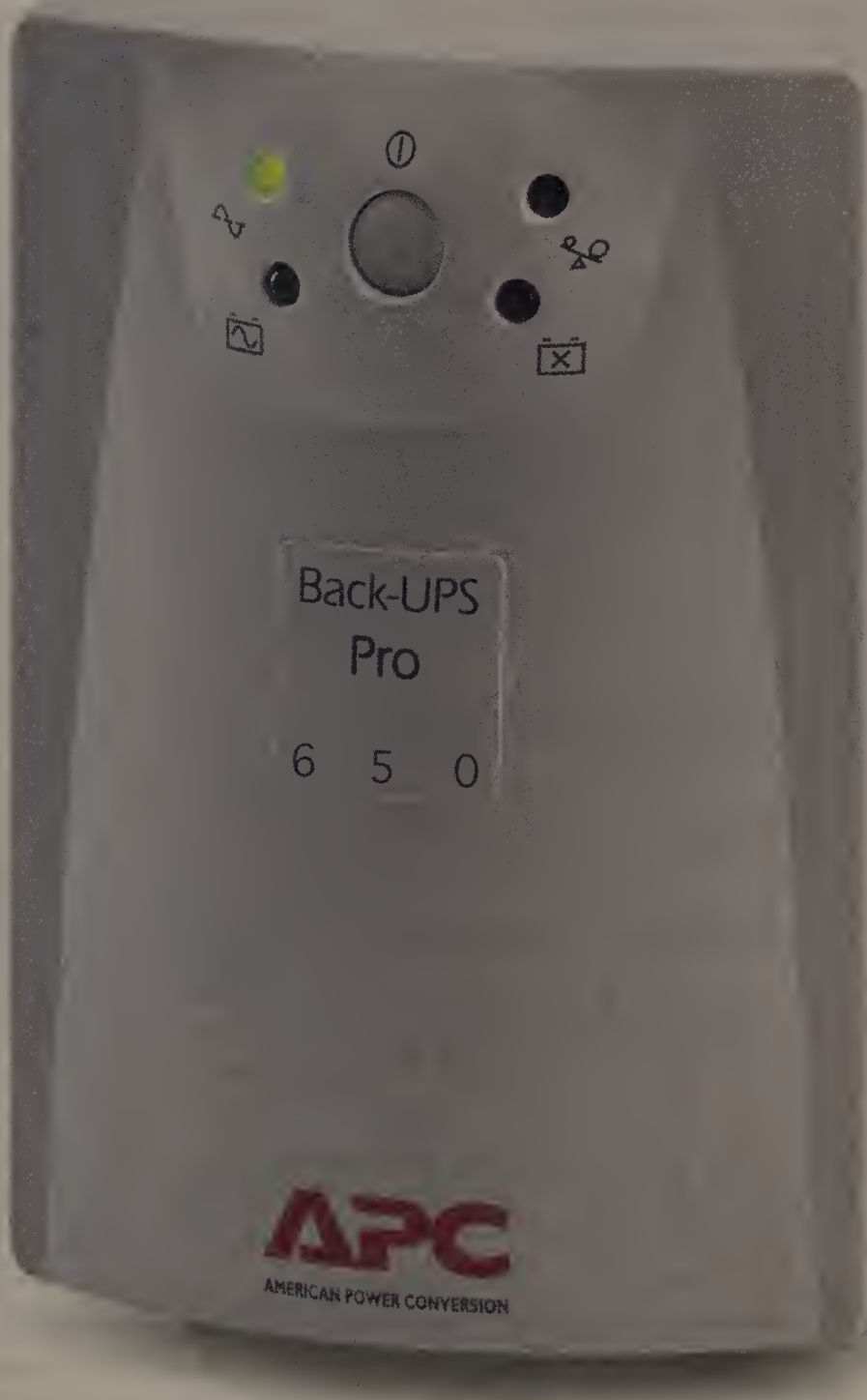

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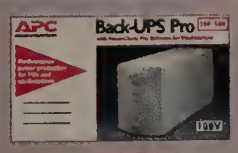

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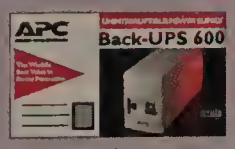
*Runtime shown is for typical Pentium desktop system and may vary with your actual load. Note: Back-UPS 200 not recommended for Pentium systems



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450	(software not included)	$254	24 min
600	(software not included)	$359	31 min
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13 Compaq DeskPro XL 5133

NEW THIS MONTH

PROS: Quality design, ethernet, multimedia

CONS: Very expensive

It's pricey at $4698, but it's fast and comes with many extras. You get some of the best service and support around, high-quality design and construction, and very good reliability. The XL 5133 sports 16MB of RAM, a 1083MB SCSI hard drive, a 15-inch Compaq monitor, a 4X CD-ROM drive, 16-bit sound, a 2MB Compaq Qvision video card, and built-in ethernet, as well as EISA slots.

14 Compaq ProLinea 5100

NEW THIS MONTH

PROS: Industry-leading support, excellent 17-inch monitor

CONS: No CD-ROM drive, only 1MB of graphics RAM

The Compaq ProLinea 5100 is a P-100 system that's priced too high for what it offers. We have no complaints about the 16MB of EDO RAM or the speedy 1080MB Quantum hard drive, and Compaq backs its PC with excellent service. Compaq also includes its own high-quality 17-inch monitor. The ProLinea 5100 has lots of expansion space. But the system was slow for its CPU class. Overall, $3386 is steep for this PC, especially since it lacks a CD-ROM drive and has only 1MB of graphics RAM.

Complete home system: PerComp's P150 Professional has a large monitor, great sound, and a fast 28.8-kbps fax-modem.

15 Compaq DeskPro 5133

NEW THIS MONTH

PROS: Highly expandable, 17-inch monitor, three-year warranty

CONS: Expensive, no sound card or fax-modem

With its P-133 CPU, 16MB of RAM, 1037MB hard drive, 4X CD-ROM drive, built-in ethernet, and 17-inch monitor, the DeskPro 5133 looks attractive for no-nonsense business types. But because it lacks a sound card and fax-modem, the $4198 price is steep. Still, Compaq's service and system reliability record is excellent, as are its around-the-clock phone support and three-year warranty.

16 Gateway 2000 P5-133

NEW THIS MONTH

PROS: Excellent price, huge 1650MB hard drive

CONS: No established turnaround repair time, some clutter around SIMM sockets

Gateway packs its $2799 P-133 desktop with 16MB of EDO RAM, a 1650MB hard drive, 256K of secondary cache, and a quad-speed CD-ROM drive. The company also includes a 17-inch Sony Vivitron monitor. This is a speedy machine, with a WorldBench score of 186—placing it among the fastest of all the P-133s we've tested. However, the P5-133 has no sound or modem capabilities. Gateway's service and reliability record doesn't match that of Dell or Micron, but this is a quick, no-frills machine at a great price.

17 Gateway 2000 P5-120

REVIEWED: December 1995

PROS: Above-average P-120 performance, nice design, three-year warranty

CONS: Only three ISA slots

The $2499 P5-120 strikes such a good balance between power and affordability that it lands on both our Power and Budget Top 20 charts. This P-120 is a good performer that offers 16MB of EDO RAM, a 1084MB hard drive, and a 4X CD-ROM drive. The graphics system is a 2MB ATI Mach 64 card paired with a Sony 15-inch monitor. The exemplary service package includes a three-year warranty and around-the-clock phone support. Gateway's ratings lag a bit on our fax-back surveys.

18 Compaq DeskPro 5100

NEW THIS MONTH

PROS: Three-year warranty, 24-hour phone support

CONS: Small monitor for the price, no multimedia

At $3138, this P-100 tower is a good value for those who plan *mucho* expansion. But you might fill the slots earlier than you think—in terms of multimedia capabilities, this PC offers *nada*. And while its 1033MB hard disk is decent, its 15-inch monitor may be too small for some users. The 5100 isn't a speed demon, but Compaq's reliability, service, and support are *magnifico*.

19 PerComp P150 Professional

NEW THIS MONTH

PROS: 6X CD-ROM drive, 24-hour toll-free tech support

CONS: One-year warranty

PerComp's first Pentium-150 PC is a good performer, although you'll find a number of P-133s that are just as fast. It comes with a huge 1624MB hard drive, and its $2899 price is reasonable, considering all the high-end extras included. Besides 16MB of EDO RAM, the PerComp features a 2MB Diamond Stealth64 Video card, a 17-inch monitor, a 28.8-kbps fax-modem, a Sound Blaster AWE32 wavetable sound card, and a 6X CD-ROM drive. However, the system has only a one-year warranty.

20 DTK Quin 54M/P133

REVIEWED: December 1995

PROS: Tons of slots and bays, 6X CD-ROM drive

CONS: Slow for a power system; no weekend telephone support

Scads of room for cards and drives and a new low price of $2990 are the highlights of this full-size tower. Configured with a Pentium-133 processor, 16MB of RAM, and a 1033MB hard drive, it's the slowest system on the Power Top 20. A 6X CD-ROM drive from Sony is a nice plus, but DTK supplied only a standard 15-inch monitor. The company's support package, which includes a two-year warranty but no phone support on weekends, is ordinary.

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THE TOP 20

PC WORLD

BUDGET DESKTOPS

1 **Dell Dimension P75t**
Get it all without blowing the budget.

		Last month	Months on chart	First reviewed	Overall rating[1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Dell Dimension P75t	2	4	Dec 95	94	100	75/76	$2049	Pentium-75	8	540
2	Gateway 2000 P5-75	9	4	Dec 95	92	98	67/71	$1659	Pentium-75	8	853
3	Vektron Multimedia P-100	13	3	Jan 96	91	171	[3]	$1995	Pentium-100	16	850
4	Dell OptiPlex GL+575	–	1	current	91	121	75/76	$2188	Pentium-75	16	540
5	CompuTrend Premio 5x86-100	8	3	Jan 96	91	126	[3]	$1649	Cx5x86-100	16	1080
6	DTK Quin 54M/P100	–	1	current	91	148	74 [3]/65 [3]	$2350	Pentium-100	16	1000
7	Diamond DT-100	–	1	Dec 95	90	156	[3]	$1785	Pentium-100	16	1080
8	Gateway 2000 P5-100	6	4	Nov 95	89	133	67/71	$2049	Pentium-100	8	1033
9	Tempest Pentium Giga Media P5-100	14	3	Jan 96	89	132	[3]	$2038	Pentium-100	16	1270
10	Gateway 2000 P5-120	10	3	Dec 95	88	176	67/71	$2499	Pentium-120	16	1084
11	Swan Pentium 75 Series	39	2	Nov 95	87	87	67 [3]/ [3]	$1898	Pentium-75	8	850
12	Compaq ProLinea 575e	20	4	Sep 95	87	96	77/76	$2077	Pentium-75	8	400
13	Austin PowerPlus 75	–	1	July 95	86	127	66 [3]/ [3]	$2308	Pentium-75	16	850
14	Polywell Poly 4120P8	19	4	Dec 95	86	73	[3]	$1849	AMD DX4-120	8	1039
15	Tempest Media Pro P-133	–	1	current	86	183	[3]	$2388	Pentium-133	16	1270
16	Austin PowerPlus 100	–	1	July 95	86	147	66 [3]/ [3]	$2449	Pentium-100	16	850
17	Digital Venturis 575	11	4	Sep 95	85	100	79/76 [3]	$2447	Pentium-75	8	850
18	Netis N4100	27	1	Dec 95	85	83	[3]	$1590	DX4-100	8	1220
19	Quantex QP5/90 M-4	–	1	current	85	147	61/63	$2199	Pentium-90	16	1282
20	Micro Express MicroFlex 586	12	3	Jan 96	85	113	59 [3]/ [3]	$1799	Cx5x86-100	16	1080

BEST BUY

[1] Percent contribution to overall rating: performance (15); price (25); features (20); reliability (25); service and support (15).

[2] Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for telephone billing) to order fax copies of system reviews. You can order an entire month's review ($9.95) and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95; available February 22). Touch-tone phone required.

2 **Gateway 2000 P5-75**
Great package for a bargain price.

3 **Vektron Multimedia P-100**
Fastest Best Buy PC.

4 **Dell OptiPlex GL+575**
Very good all-around system.

5 **CompuTrend Premio 5x86-100**
Least expensive Best Buy.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Reader service no.	Comments[2] (Recommended as home system)
4X	ISA, PCI	17"/.26	800/613-3355	733	Not especially fast or well loaded, but has big screen, low price and very good support.
4X	ISA, PCI	15"/.25	800/846-2000	734	Underwhelming feature set and speed, but one of the cheapest systems on chart.
4X	ISA, PCI	15"/.28	800/725-0026	735	Very good price on one of the fastest PCs on chart; we have little service and reliability data for the company.
4X	ISA, PCI	15"/.25	800/613-3355	736	Decent speed plus low price plus very good system reliability plus excellent service equals a great deal.
4X	ISA, PCI	15"/.28	800/677-6477	737	Exceptionally inexpensive system; we lack service and reliability data on the company.
6X	ISA, PCI	15"/.28	800/289-2385	738	Affordable PC is well decked out with large hard disk and fast CD-ROM drive.
6X	ISA, PCI	14"/.28	800/989-7253	739	Very inexpensive for its comparatively rich feature set.
4X	ISA, PCI	15"/.25	800/846-2000	740	Good all-around budget system, and the price is right.
4X	ISA, PCI	15"/.28	800/818-5163	741	Comes with decent features for the money.
4X	ISA, PCI	15"/.25	800/846-2000	742	Very inexpensive and fast for a P-120. Only budget system to make Power chart.
4X	ISA, PCI	15"/.28	800/261-7926	743	Sluggish, but otherwise a respectable system at an enticing price.
—	ISA, PCI	15"/.28	800/345-1518	744	Expensive for the sparse features, but backed by a very good system reliability rating.
4X	ISA, PCI	15"/.28	800/752-1577	745	Affordable; decent speed, features.
4X	ISA, PCI	15"/.28	800/223-6571	746	Slowest PC on chart, but good features for the money.
4X	ISA, PCI	15"/.28	800/818-5163	747	Nicely decked-out PC outruns most power systems.
4X	ISA, PCI	15"/.28	800/752-1577	748	A bit expensive for the ho-hum features; has relatively small hard disk.
4X	ISA, PCI	14"/.28	800/722-9332	749	Expensive PC with small monitor, but Digital has an excellent system reliability rating.
4X	ISA, PCI	15"/.28	800/577-7526	750	Nice features and bargain-basement price.
4X	ISA, PCI	15"/.28	800/896-4898	751	Good features for the money, including spacious hard disk, but service and system reliability rate low.
4X	ISA, PCI	15"/.28	800/989-9900	752	One of the faster budget PCs you can buy; nice feature set for the price. Low reliability score.

[3] We received fewer than 100 Reliability and Service Monitor responses for this company. Its ratings are based on a combination of responses for it and the average for all companies for which we received 20 to 99 responses. If we received fewer than 20 reliability or service responses for a company, no score appears.

For more information about all products in this table, circle reader service no. 909.

Top 20 Budget Desktops

1 Dell Dimension P75t

REVIEWED: December 1995

PROS: Great service, 17-inch monitor

CONS: Small hard drive, no secondary cache

Perennial Best Buy winners, Dell Dimension computers usually garner nothing but praise. The $2049 Dimension P75t—somewhat reconfigured from last month—is no exception, although the feature set isn't as robust as that of other systems. Performance is good for a Pentium-75, but the system would have done better with 16MB of RAM instead of the 8MB that was installed (even if it was fast EDO RAM). Dell also saved money by leaving out a secondary cache altogether, rather than adding 256K of this cache, as is common in desktop computers. And even the supplied 540MB hard drive is underwhelming.

Dell P75t

But this compact offers full multimedia, including a Mitsumi quad-speed CD-ROM drive, a Creative Labs Vibra 16S Sound Blaster–compatible sound card, and an S3 Trio64–based video board with 2MB of DRAM. It also comes with a big, beautiful 17-inch Dell UltraScan V17X Color monitor—a major perk for a P-75 budget PC. In the end, you may want to opt for a 15-inch monitor and put the savings toward extra memory, a secondary cache, or a larger hard drive. Whatever configuration you decide on, it's backed by Dell's excellent service and system reliability record.

2 Gateway 2000 P5-75

REVIEWED: December 1995

PROS: Lower price than last month, three-year parts warranty

CONS: No secondary cache

Ordinarily, features like a quick ATI video card with 2MB of graphics RAM, a vivid 15-inch Sony Vivitron monitor, and a quad-speed CD-ROM drive would garner this Pentium-75 system a hearty recommendation for entry-level users. However, this inexpensive $1659 compact comes with only 8MB of EDO RAM and no secondary cache. Still, you get adequate Windows 95 performance, although we'd recommend another 8MB of RAM. Its 853MB hard disk is a bit small, but the price on the P5-75 is so low, you can go for an extra 8MB of RAM and multimedia capabilities, and it's still affordable.

Gateway P5-75

3 Vektron Multimedia P-100

REVIEWED: January 1996

PROS: Fastest P-100 on chart, full multimedia, very attractive price

CONS: One-year warranty

This speedy Pentium-100–based minitower delivers everything you need in a multimedia PC for just $1995—in short, it's an excellent value. Our test system came with 16MB of RAM, an 850MB hard drive, a quad-speed CD-ROM drive, a 15-inch monitor, and a 14.4-kbps fax-modem. The Diamond Stealth64 Video board was fully packed with 4MB of graphics RAM, and the multimedia complement was filled out with a 16-bit sound card.

Vektron P-100

Expansion is good, with two free externally accessible drive bays and several free ISA and PCI slots. Vektron's support policies are average—we'd like to see more than the basic one-year warranty—but it's hard to quibble when you get all these goodies at such a low price.

4 Dell OptiPlex GL+575

NEW THIS MONTH

PROS: Network ready, great system manual

CONS: No open drive bays, no sound card

The Dell OptiPlex GL+575 is designed for use on networks, right down to its built-in ethernet adapter and bundled network software. It performs typically for its processor class, a Pentium-75 with 16MB of EDO RAM. But in order to come in at a very affordable $2188, Dell had to cut a few corners: In our test system, the hard drive was small, 540MB; slot expandability was fair, but there were no free drive bays (because of the small pizza-box format); and the quadruple-speed CD-ROM drive would have benefitted from a sound card. The integrated S3 Trio64/64 graphics chip is a good match for the Dell 15-inch monitor, but with just 1MB of DRAM, it can't support super VGA and true color. Support policies are superb, including a three-year warranty. Despite the storage limitations, the OptiPlex is an excellent choice for networked terminals that don't require full multimedia.

Dell OptiPlex GL

5 CompuTrend Premio 5x86-100

REVIEWED: January 1996

PROS: Great price, Pentium-75–like performance, multimedia

CONS: No weekend support, flexy motherboard, low-end monitor

With its 100-MHz Cx586 processor, the very inexpensive $1649 Premio 5x86-100 keeps abreast of many Pentium-75–based desktop systems that we've reviewed. Our unit came loaded with

Cruise the Internet as fast as modemly possible.

PC WORLD
BEST BUY MODEM
4 MONTHS IN A ROW!

The U.S. Robotics Sportster is the fastest, most reliable modem you can buy. For compatibility, connectivity and cumulative throughput, the Sportster proved to excel well beyond its nearest competitors in two separate and equally uncompromising independent lab tests. And during this incredible comparative exhibition, it not only outperformed other 28.8 Kbps modems, it outperformed the ratified standard for speed by working beautifully in a 33.6 Kbps mode.

And as if that weren't enough, the Sportster also comes with a kit containing everything you need to get on the Internet immediately. This kit includes a user-friendly 150-page World Wide Web guide book written just for the Sportster, software for optimum Web navigation, and free registration with NetCom, GNN® and CompuServe® Internet Division.

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CompuTrend

16MB of RAM, a 1080MB hard drive, a quad-speed CD-ROM drive, a Number Nine 9FX Motion531 video board with 2MB of DRAM, and a 16-bit sound card. Only a flimsy motherboard and a low-end monitor hold the Premio back from a higher ranking. CompuTrend's two-year warranty is fairly strong, but on-site service costs extra. Unfortunately, we don't have enough reader fax-back survey responses to comment on the company's service and system reliability record.

6 DTK Quin 54M/P100

NEW THIS MONTH

PROS: Good Pentium-100 performance, 6X CD-ROM drive

CONS: None significant

At $2350, this P-100 is a bit pricey for its processor class, but the bulky tower delivers a lot for the money. Our system came with 16MB of RAM, a 1GB Enhanced IDE hard drive, a 15-inch monitor, a 6X Teac CD-ROM drive, a 2MB Diamond Stealth64 video board, a Vibra 16 sound card, and lots of spare slots and bays. For a P-100, the DTK turned in some impressive performance scores.

DTK's support policies are decent, including a two-year warranty. Based on the small number of survey responses received from our readers, the company rates so-so in service.

7 Diamond DT-100

REVIEWED: December 1995

PROS: Solid performance, great price

CONS: One-year warranty, small monitor, poor documentation

It's no easy task to find a P-100 for $1785, never mind one with a 6X CD-ROM drive, 16MB of RAM, and a 1080MB hard drive. The Diamond DT-100's performance is respectable, and this minitower offers good expandability. Diamond kept the price low by including only 1MB of graphics RAM and by leaving out a sound card. The 14-inch monitor is also a big money saver, but we recommend a larger one. Diamond's one-year warranty is marginal by today's standards. Overall, though, this PC is a great deal. You could get it with full multimedia and a 15-inch monitor for under $2000.

8 Gateway 2000 P5-100

REVIEWED: November 1995

PROS: Inexpensive; quad-speed CD-ROM drive

CONS: None significant

Even with an appealing $2049 price, the Gateway 2000 P5-100 suffers the fate of many PCs with 8MB of RAM running Windows 95: sluggish performance for a Pentium-100. But with features like a 1033MB hard drive, 2MB ATI graphics card, and 15-inch Sony Vivitron CDD-15F23 monitor, there's much to like about it—and Gateway's service and reliability numbers are on the rise.

9 Tempest Pentium Giga Media P5-100

REVIEWED: January 1996

PROS: Multimedia, generous hard disk, fax-modem

CONS: None significant

Generous expansion and storage space characterizes this roomy P-100 tower system from Tempest Micro. Inside is a 1270MB hard drive, 16MB of RAM, and a quad-speed CD-ROM drive.

Tempest also includes a 15-inch monitor, a 14.4-kbps fax-modem, and 16-bit sound, making this a good basic home office system with plenty of room for growth. The PC is slow for a P-100, but it's still a good value for $2038.

10 Gateway 2000 P5-120

REVIEWED: December 1995

PROS: Above-average P-120 performance, nice design, three-year warranty

CONS: Only three ISA slots

If you're experiencing déjà vu, it's because you already read about this PC in the Power Top 20. It's no mean feat to make both charts, and the P5-120 is the only one to do that this month. You get a fine all-around system for $2499: a P-120 with very good performance, 16MB of RAM, a 1084MB hard drive, and a 4X CD-ROM drive. The graphics system is good too: a 2MB ATI Mach 64 card paired with a 15-inch Vivitron monitor. The manuals are great, and the service package includes a three-year warranty and 24-hour support. If Gateway keeps improving its service and reliability ratings, more of its PCs will have a shot at our Best Buy spots.

11 Swan Pentium 75 Series

REVIEWED: November 1995

PROS: Integrated voice-enabled fax-modem, bundled software

CONS: Slowest P-75 tested, one-year warranty

This $1898 PC is well equipped for home office use, but ordinary service policies and poor performance on our PC WorldBench tests drag it down. The system's 8MB of RAM is marginal for Windows 95 computing, and its 850MB hard drive is on the small side. Also, the 1MB STB PowerGraph 64 Video card can't display true color at 800 by 600 resolution. But the Toshiba quad-speed CD-ROM drive, Vibra 16 sound board, and 14.4-kbps data/fax/voice modem are pluses. The system comes with a year of on-site service.

12 Compaq ProLinea 575e

REVIEWED: September 1995

PROS: Well built, great system reliability and service

CONS: Sluggish performance, pricey for the configuration

This P-75 PC has "quality" written all over it—and you pay for all $2077 of it. The ProLinea 575e is not a spectacular performer. And with no CD-ROM drive or sound card and only 8MB of RAM and a skimpy 400MB hard disk, this system is minimally configured. Compaq did include its own quality 15-inch monitor, however, and the PC is backed by a long three-year warranty and a company with a fine reputation for service and computer reliability.

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Circle 74 on reader service card

13 Austin PowerPlus 75

REVIEWED: July 1995

PROS: Nimble performer, fax-modem, good support policies

CONS: None significant

This $2308 minitower was the fastest P-75 we tested and offers 16MB of RAM, an 850MB hard drive, a quad-speed CD-ROM drive, a MediaLogic ISP-16 sound card, and a 14.4-kbps fax-modem. The graphics system is a 2MB VideoLogic GrafixStar 300 card and a 15-inch monitor. The ample software bundle, three-year warranty, and around-the-clock support are also commendable.

14 Polywell Poly 4120P8

REVIEWED: December 1995

PROS: Inexpensive, full multimedia

CONS: Slow, poor monitor quality

It's priced right, at $1849, but this AmDX4-120 minitower with only 8MB of RAM turned in low performance scores. On the upside, it has a 1039MB hard drive, a 4X CD-ROM drive, a sound card, and a 2MB Diamond Stealth64 Video card. Polywell's five-year labor and three-year parts warranty is very good, although there's limited support for weekend warriors. We'd also like to see better screen clarity than the 15-inch monitor provides.

A whole lotta machine for $2350: DTK's Quin 54M/P100 offers 16MB of RAM, a 1GB hard disk, and a 6X CD-ROM drive.

15 Tempest Media Pro P-133

NEW THIS MONTH

PROS: Great performance, good value, has fast EDO RAM and lots of extras

CONS: Nothing significant

This very fast P-133 tower is loaded with extras, and the price is nice at $2388. Besides including a 15-inch monitor, Tempest Micro filled the PC with 16MB of EDO RAM, a 1270MB hard drive, a 4X CD-ROM drive, a 2MB Diamond Stealth64 2001 video board with MPEG support, and a sound board. Too bad the company paired it with very ordinary speakers.

Tempest Micro backs its system with a two-year warranty and standard service and support options. The company also throws in a bundle of CD-ROMs with the PC, including Microsoft's Encarta 95 and Works. This is the first P-133 to make our Budget chart.

16 Austin PowerPlus 100

REVIEWED: July 1995

PROS: Good performance, fax-modem

CONS: A bit pricey for a P-100

You get a lot of PC here, but most P-100s cost less. Besides 16MB of RAM and an 850MB hard drive, this expandable $2449 midsize tower comes with an integrated Vibra 16 sound chip, a 4X CD-ROM drive, a 14.4-kbps internal fax-modem, and 5-watt external stereo speakers. The graphics controller is on a 2MB ATI Mach 64 PCI card, a good match for the 15-inch monitor. Austin also has a great system manual and toll-free around-the-clock support.

17 Digital Venturis 575

REVIEWED: September 1995

PROS: Great service and excellent PC reliability

CONS: Small monitor, only one free drive bay

For $2447, we expected more for the money—this system offers only 8MB of RAM, a relatively small 850MB hard drive, a skimpy 14-inch monitor, and a 4X CD-ROM drive, but no sound card. On the plus side, Digital builds high-quality PCs and does well in our service and reliability surveys.

18 Netis N4100

REVIEWED: December 1995

PROS: Bargain-basement price, big hard drive, multimedia

CONS: Only 8MB of RAM

It's hard to recommend a 486, but if you're on a supertight budget, you may want to consider this $1590 PC. This DX4-100 is almost as fast as a P-75, despite having only 8MB of RAM, and its 1220MB hard drive is ample. You also get a sound card, a 4X CD-ROM drive, a 2MB Diamond Stealth64 Video card, and a 15-inch monitor. If you want to add even more peripherals, you've got four free drive bays and five free slots to work with. Netis covers parts for one year and labor for three years.

19 Quantex QP5/90 M-4

NEW THIS MONTH

PROS: Affordable, nimble performer, 28.8-kbps fax-modem

CONS: Skimpy warranty, ho-hum reliability score

For $2199, you get a fast P-90 minitower with 16MB of RAM, a 1282MB hard drive, a 4X CD-ROM drive, a sound card, speakers, a fast fax-modem, and a 15-inch monitor. And you still have plenty of room to grow. Drawbacks? Quantex's below-average system reliability and service scores, and a one-year warranty.

20 Micro Express MicroFlex 586

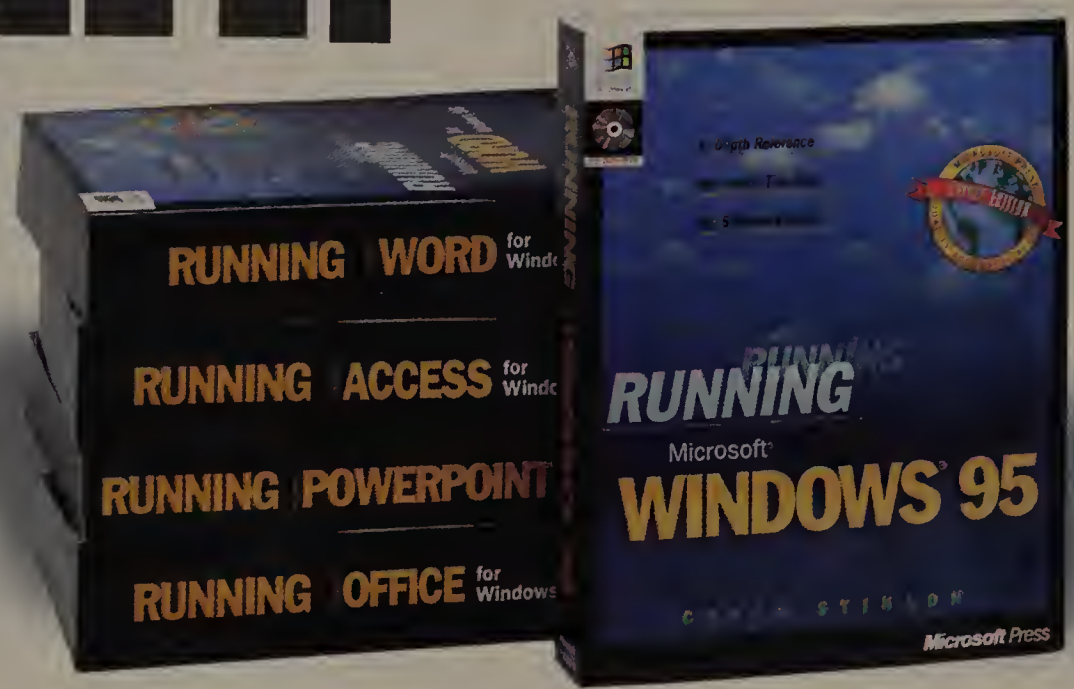
REVIEWED: January 1996

PROS: Good speed, a lot of PC for the money

CONS: No sound or speakers

This $1799 Cyrix 5x86-100 PC fared well in our PC WorldBench test suite, besting a number of P-75s on the chart. Features include 16MB of RAM, a 1080MB hard disk, a 2MB STB Velocity 64V video board, and a 4X CD-ROM drive. Some of the components, like the keyboard and 15-inch monitor, aren't the highest quality, but Micro Express offers a decent two-year warranty.

Everything you need for the long run.



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THE TOP 20

PC WORLD

NOTEBOOK PCs

1 **Toshiba Satellite Pro 400CDT**
Great desktop replacement.

POWER SYSTEMS

		Last month	Months on chart	First reviewed	Overall rating[1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Toshiba Satellite Pro 400CDT	5	3	Jan 96	89	124	85/71 [4]	$4078	Pentium-75	16	810
2	Dell Latitude LX 4100T	–	1	Feb 96	88	109	78 [4]/69 [4]	$2979	DX4-100	16	810
3	WinBook XP5	–	1	current	86	124	61/80 [4]	$2999	Pentium-75	16	814
4	Austin Business Audio P-90	3	2	Feb 96	86	133	70 [4]/ [4]	$3496	Pentium-90	16	720
5	Dell Latitude XPi P90T	1	5	Nov 95	86	118	78 [4]/71 [4]	$4199	Pentium-90	16	810
6	Toshiba Portégé 610CT	2	4	Dec 95	85	99	85/71 [4]	$3999	Pentium-90	8	720
7	Dell Latitude XPi P75D	4	5	Nov 95	85	106	78 [4]/71 [4]	$3099	Pentium-75	16	420
8	Broadax NP 5263T	–	1	current	84	144	[4]	$3930	Pentium-133	16	1295
9	AMS Power CDNB85	–	1	current	81	139	[4]	$4073	Pentium-120	16	810
10	Texas Instruments TravelMate 5100	10	5	Nov 95	81	125	66 [4]/ [4]	$4798	Pentium-90	16	1160

BUDGET SYSTEMS

		Last month	Months on chart	First reviewed	Overall rating[1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Toshiba Satellite T2130CS	–	1	current	85	65	85/71 [4]	$1999	DX4-75	8	520
2	Dell Latitude LX 4100D	1	5	Nov 95	85	84	78 [4]/69 [4]	$2299	DX4-100	8	420
3	NEC Versa 2000D	2	2	Feb 96	80	49	77 [4]/ [4]	$1888	DX4-75	8	360
4	AMS SoundPro DX4-100	3	2	Feb 96	78	67	[4]	$2040	DX4-100	8	516
5	Compaq Contura 430C	–	1	current	77	65	71/72 [4]	$2499	DX4-100	8	720
6	Acom Patriot 4000F	9	5	Nov 95	77	71	[4]	$2120	DX4-100	8	543
7	Sharp PC-3050	8	2	Feb 96	76	57	[4]	$2599	Cx486DX2-66	8	543
8	MPC TouchNote 1000	–	1	current	76	74	[4]	$2165	Pentium-75	8	518
9	NEC Versa 2000C	–	1	current	76	59	77 [4]/ [4]	$2599	DX4-75	8	540
10	CTX EZBook 5x86-100	–	1	current	75	80	[4]	$2599	Cx5x86-100	16	420

BEST BUY

[1] Percent contribution to overall rating for power notebooks: performance (22); price (14); battery (8); weight (8); features and design (16); reliability (22); service and support (10). Percent contribution to overall rating for budget notebooks is the same except performance (14) and price (22). [2] CA = color active, CD = color dual-scan, CP = color passive. [3] Call 800/434-4495 (for payment by Visa or MasterCard) or 900/903-2972 (for telephone billing) to order fax copies of system reviews. You can order an entire month's review ($9.95) and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and cap-

2 **Dell Latitude LX 4100T**
Best package for under $3000.

1 **Toshiba Satellite T2130CS**
Tremendous deal for $1999.

2 **Dell Latitude LX 4100D**
Fastest budget note around.

Weight (pounds)	Battery life (hours)	Screen type/ size[2]	Vendor contact number	Reader service no.	Comments[3]
9	4:21	CA/10.4"	800/457-7777	753	Expensive, heavy, but also fast, feature rich; from notebook company with highest system reliability rating.
7.2	4:26	CA/10.3"	800/613-3355	754	Fast, cheap, good battery life and screen—your top choice in an affordable power note.
7.2	5:01	CA/10.3"	800/468-2162	755	One of the fastest notes available for under $3000; nice screen, long battery life, fax-modem.
8.2	3:35	CA/10.3"	800/321-1501	756	Reasonable price for fast, feature-laden note, but company has ho-hum reliability.
7.2	3:33	CA/10.3"	800/613-3355	757	Expensive, but fast, good features, very good service and reliability ratings.
6.4	5:09	CA/9.5"	800/457-7777	758	Pricey, but this light unit is backed by company with top system reliability reputation.
7.4	3:28	CD/10.3"	800/613-3355	759	Small hard disk, but generally a good affordable power note.
9.8	1:04	CA/10.4"	800/872-4547	760	Has features many desktops don't, but low reliability and service scores, pitiful battery life drag it down.
8.8	1:51	CP/10.2"	800/886-2671	761	Not cheap, lousy battery life, lackluster screen—but boy, is it fast.
7.4	5:06	CA/10.4"	800/848-3927	762	Very fast, big hard disk, long battery life, but high price and low system reliability rating.
7.2	3:01	CD/10.5"	800/457-7777	763	A great price for unit likely to be highly reliable.
7.2	5:11	CD/10.3"	800/613-3355	764	Fastest on budget chart, very good battery life, and Dell units are known for reliability.
7.2	5:09	CP/10.4"	800/632-4636	765	Slowest on chart, but also the cheapest; has long battery life and is built to last.
8.2	3:53	CA/10"	800/886-2671	767	Very good performer, well appointed, very affordable.
7.4	4:46	CD/10.4"	800/345-1518	768	Good all-around unit with commendable service and reliability ratings.
7.8	2:42	CP/10.5"	800/898-2665	769	Fast, but short battery life.
7.4	3:17	CD/10.3"	800/237-4277	770	Neither fast nor especially cheap.
7.6	3:46	CP/10.4"	800/672-9979	771	One of the fastest budget notes going.
7.8	3:16	CA/9.5"	800/632-4636	772	Expensive and slow for a budget note, but built to last.
7.8	3:41	CA/10.4"	800/888-9052	766	Great price for a note with 16MB of RAM; second-fastest budget notebook.

sule reviews in advance (The Top 20 Flash Report, $9.95; available February 22). Touch-tone phone required. [4] We received fewer than 100 Reliability and Service Monitor responses for this company. Its ratings are based on a combination of responses for it and the average for all companies for which we received 20 to 99 responses. If we received fewer than 20 reliability or service responses for a company, no score appears.

For more information about all products in this table, circle reader service no. 910.

Top 10 Power Notebooks

1 Toshiba Satellite Pro 400CDT

REVIEWED: January 1996

PROS: Fast, internal CD-ROM drive, infrared port

CONS: Expensive

Even at a street price that's $600 less than last month (it's now $4078), Toshiba's top-of-the-line Pentium-75 notebook is still pricey. But oh, what you get for the money in this number one power notebook: multimedia components galore, including a built-in quadruple-speed CD-ROM drive; 16MB of RAM; a generous 810MB hard drive; and performance that rivals that of many Pentium-90 notebook PCs. True, at 9 pounds this portable is heavier than most we've looked at, making it tough to go from one end of O'Hare to the other. However, you could trim the weight to 7.8 pounds if you leave the floppy drive at home, and you still get lots of multimedia extras, plus a big, sturdy keyboard with one of the easiest-to-use eraserhead-style pointing devices we've tested. The 10.4-inch active-matrix color display supports up to 16.8 million colors, making it a presenter's dream. And battery life is respectable at 4 hours and 21 minutes. According to our readers, Toshiba's service and notebook reliability record is first rate.

Toshiba 400CDT

2 Dell Latitude LX 4100T

REVIEWED: February 1996

PROS: Fast, inexpensive, great vendor support

CONS: None significant

After we reviewed this DX4-100 in February, Dell boosted the model's standard RAM to 16MB and the hard drive size from 524MB to 810MB, and also added 128K of secondary cache, all to better accommodate the demands of Windows 95. At $2979, it's now pricier by almost $700 but powerful enough to claim a Best Buy this month on the power chart. It owes its high rating to good Dell support, reliability, and documentation; quality components, including a 10.3-inch active-matrix display; and extremely good performance, no doubt helped by the beefed-up configuration. The Latitude LX 4100T performs better than Toshiba's 90-MHz Portégé 610CT in the number six spot. The system also has a decent 4.5-hour battery life. In short, the LX 4100T has what it takes to be a Best Buy: It covers all the bases—low price, impressive speed and feature set, excellent support policies, and highly rated service and notebook reliability.

Dell 4100T

3 WinBook XP5

NEW THIS MONTH

PROS: Very fast, fax-modem

CONS: Short warranty

This 7.2-pound notebook is an excellent performer—it tied with the Toshiba Satellite Pro 400CDT for the best Pentium-75 score in a notebook. And it comes with some nice features for a very reasonable $2999: 16MB of RAM, an 814MB removable hard drive, 256K of secondary cache, and a big active-matrix screen, and we got 5 hours of battery life in our run-down test. WinBook also throws in an internal 14.4-kbps fax-modem, leaving your PC Card slots free. The pointing device is stiff, but the keyboard is comfortable to use. Our only complaint is the one-year warranty.

4 Austin Business Audio P-90

REVIEWED: February 1996

PROS: Fast, sharp display, solidly built

CONS: Heavy; uncomfortable trackball button placement

With a complete sound system—sound card, microphone, speaker, and external jacks—this P-90 notebook lives up to its name. Other extras are the 14.4-kbps modem, the removable 720MB hard drive, the ample 16MB of RAM, and 10.3-inch active-matrix screen. This PC turned in a terrific performance; it's the fastest P-90 we've tested using WorldBench. It's heavy at 8.2 pounds, however, and its 3.5-hour battery life could be better. These drawbacks and a higher price than the vendor reported to us for our February issue keep this P-90 out of the Best Buy ranks. The correct street price is $3496—not February's $3008, which gets you this note with only a dual-passive color display. Still, that price is reasonable.

5 Dell Latitude XPi P90T

REVIEWED: November 1995

PROS: Really quick, top-of-the-line components, great support

CONS: None significant

Dell's high-powered XPi P90T is nearly identical to its less expensive sibling, the XPi P75D, but costs about $1100 more ($4199), primarily due to its faster processor and better screen. Like the XPi P75D, the P90T is an average performer for its CPU class, which means it's still pretty fast for a notebook. It comes with an 810MB removable hard drive and 16MB of RAM. The P90T's active-matrix screen and support for 16.8 million colors make it a better choice than the P75D for graphics-intensive or presentation work, but bring a couple of battery packs on long flights—it gives you only 3.5 hours of AC-less computing on a charge.

6 Toshiba Portégé 610CT

REVIEWED: December 1995

PROS: Very light; built-in sound, great system reliability

CONS: Cramped keyboard, small screen

A $600 drop in price to $3999 increases this Pentium-90 subnotebook's value as a lightweight, well-supported traveler's machine.

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Although a less-than-stellar performance under our new WorldBench drags the Portégé down the chart this month (it was the slowest P-90 we tested), it's still more than fast enough for basic business applications.

As with most subnotebooks, the best and worst thing about the Portégé 610CT is its size. No thicker than a couple of average magazines and weighing only 6.4 pounds, even including its external floppy drive, the 610CT still manages to cram lots of high-end components into its gray case, including a 720MB hard drive, 16-bit sound, and a built-in speaker (no CD-ROM drive, though). But you'll have to get by with a 9.5-inch screen and use a cramped minijoystick for an input device. However, the screen uses active-matrix technology, and battery life is very good at over 5 hours.

7 Dell Latitude XPi P75D

REVIEWED: November 1995

PROS: Nice design, great support

CONS: None significant

A price drop of $800 to $3099 helped this lower-end sibling of Dell's near-identical XPi P90T notebook maintain a healthy status on the power notebook chart. You still get lots of RAM (16MB), though the removable 420MB hard disk is small, considering that a lot of notebooks are starting to show up nowadays with 720MB or more of hard disk space. The nice 10.3-inch dual-scan screen does not offer nearly as wide a viewing angle or the sharpness of colors of its sibling's active-matrix screen, and the latter type of screen has become almost standard on pricier notebooks these days. Still, this unit's screen displays over 65,000 colors at once, giving you surprisingly rich images for a notebook. The P75D comes with the same highly regarded support and documentation as the other Dell machines we review here, and it features the same oversized wrist rest and comfortable, full-size keyboard as the P90T. Compared to other Pentium-75 notebooks, however, it's a lackluster performer, and battery life, which is just shy of 3.5 hours, could be better.

8 Broadax NP 5263T

NEW THIS MONTH

PROS: Fastest notebook yet, full multimedia, large hard drive

CONS: Short battery life; heavy

If you're in the market for a superfast multimedia notebook with a stiletto-sharp, 10.4-inch active-matrix screen, 16MB of RAM, and a roomy 1298MB hard drive, you'll want to put the $3930 Broadax NP 5263T on your list. The first 133-MHz Pentium notebook we've tested, this portable is also the fastest on the chart, not surprisingly. It's well designed—there are even joystick controls on the palm rest. But there are a couple of catches. The notebook's battery dries up after just about an hour of use, so don't plan on being away from power all day long. Also, the 9.8-pound traveling weight will strain shoulders. Broadax's toll-call technical support line and short one-year warranty don't earn any points, either. Because we have not received enough responses from our fax-back reader survey, we can't really comment on the company's service and notebook reliability record.

9 AMS Power CDNB85

NEW THIS MONTH

PROS: Awesome speed for a portable, full multimedia capabilities, large hard drive

CONS: Wimpy battery life, heavy, one-year warranty

With the Power CDNB85, you can really take your show on the road. For $4073, the system offers a full multimedia configuration (double-speed CD-ROM drive, 16-bit sound, built-in speakers); a spacious, removable 810MB hard drive; 16MB of RAM and 2MB of graphics RAM; and spry Pentium-120 performance—in fact, it's the next-best performer on the power notebook chart, passed only by the Broadax unit. All these features add up to a bulky 8.8 pounds, though, and the 10.2-inch screen is only a passive color display. The one-year warranty is chintzy, and the sub-2-hour battery life is very disappointing.

10 Texas Instruments TravelMate 5100

REVIEWED: November 1995

PROS: Very fast, extended battery life, huge hard drive, infrared port

CONS: No weekend support

Just months ago, this Pentium-90 notebook cost $1100 more than it does now. Still, it was a good value, considering its strengths—a capacious hard drive (1160MB), 256K of secondary cache, 16MB of RAM, and a keen 10.4-inch, active-matrix color screen supporting 24-bit color at 640 by 480 resolution. Then there's the notebook's intelligent design, roomy keyboard, comfortable weight (7.4 pounds), and good battery life (about 5 hours). TI's three-year warranty sweetened the deal, too, though there's no support on weekends. The new $4798 price makes it a more reasonable choice for a power notebook.

Top 10 Budget Notebooks

1 Toshiba Satellite T2130CS

NEW THIS MONTH

PROS: Low price, great service and reliability

CONS: Mediocre battery life

Toshiba specializes in notebooks, and it shows in the design of the new Toshiba Satellite T2130CS, our number one budget portable this month. This extremely inexpensive ($1999) notebook comes configured with the typical basics: 8MB of RAM, a 520MB hard drive, and a PC Card Type III slot. It's housed in a stylish gray case. What sets it apart are its particularly easy-to-use eraserheadlike pointing device; really good keyboard; and uncommonly large, good-quality 10.5-inch dual-scan screen, all neatly tucked into a relatively light 7.2-pound case. However, the screen is limited to

Toshiba T2130CS

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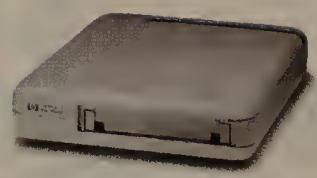

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256 simultaneous colors, and you can't display images on the internal screen and an external monitor at the same time.

The T2130CS has the distinction of being the fastest DX4-75 on the chart, making it perfectly fine for most business apps, although we expect a little more oomph from budget notes these days. Toshiba's service, support, and reliability are overall the best of any vendor's we review this month, except for its brief one-year warranty. Battery life could be better, too: It lasted only 3 hours in our battery run-down test. While this is a simple, basic note, Toshiba quality and support plus the system's low price make it an excellent value and a worthy Best Buy.

2 Dell Latitude LX 4100D

REVIEWED: November 1995

PROS: Lightning quick, compact, reliable

CONS: Small keyboard, dark screen

A no-frills, low-price $2299 machine that will appeal to users who don't care about having multimedia features, the Latitude LX 4100D drops to second place on the chart after reigning as the best budget portable for four months in a row. Although mostly basic, the 4100D comes with some nice extras, including a floppy drive that pops out for a second battery, and a number of useful system management utilities. According to our latest reader fax surveys, Dell earns one of the highest ratings for service, and only Toshiba beats it in reliability. The extensive documentation is first-rate. We found the keyboard a bit cramped, but the centered trackball rolls smoothly and is easy to reach. Our only other complaint: The dual-scan screen could be brighter.

Dell 4100D

The 4100D's battery ran Windows 95 applications for 5 hours and 11 minutes when tested with the same run-down exercise we used under Windows 3.1—not bad, but shorter than the near 6-hour battery life we found under Windows 3.1. What it lost in battery life, however, the 4100D gained in speed: Aided by its 128K of secondary cache, it was the fastest of the budget DX4-100 notebooks we tested with our new WorldBench suite.

3 NEC Versa 2000D

REVIEWED: February 1996

PROS: Low price, good display, removable hard drive

CONS: Slow for its CPU class

As the cheapest budget notebook on our chart, the $1888 NEC Versa 2000D represents an excellent value. Along with the price, we liked this portable's stylish lines and comfortable keyboard, its lengthy 5-hour-plus battery life, and the surprising crispness and clarity of its spacious 10.4-inch passive color display. And NEC has a decent reputation for its service and system reliability among our readers. But there are a couple of major drawbacks: The 2000D is the slowest DX4-75 notebook we tested with WorldBench—in fact, it's the slowest notebook on our chart. And you'll be glad the hard drive is easily upgradable, because the supplied 360MB drive is very small by today's standards. However, it's so inexpensive, you could add a larger hard drive and another 8MB of RAM and still get an affordable notebook.

4 AMS SoundPro DX4-100

REVIEWED: February 1996

PROS: Very good performer for a budget notebook, inexpensive, has removable hard drive

CONS: Trackball too small

At 8.2 pounds, AMS's SoundPro DX4-100 is one of the heavier notebooks we've seen, but at $2040 it's priced competitively for a portable with as many extras as it has—such as its spacious 10-inch active-matrix color screen (still rare on budget notebooks), internal sound card, microphone and speaker, as well as external audio jacks. While the system was one of the slowest DX4-100 notebooks we tested with our new PC WorldBench test suite, it's still pretty quick for a budget notebook unit. But if you have big fingers, you might find the small trackball and stiff mouse buttons uncomfortable to use. The SoundPro DX4-100's 516MB hard drive is adequate for a budget machine, and its battery life is decent at nearly 4 hours of computing on a charge. We have not yet received enough fax survey returns from our readers to be able to comment on AMS's service record or the general reliability of this company's notebooks.

5 Compaq Contura 430C

NEW THIS MONTH

PROS: Low price, nice design

CONS: None significant

This ergonomically pleasing portable, which first (and last) appeared on our power notebook chart in December, is reincarnated this month as a budget machine thanks to a $500 drop to $2499. That's an especially good price for 8MB of RAM, a 720MB hard drive, a 10.4-inch color dual-scan screen, and a comfortable keyboard—we especially liked the big keys and fluid trackball. The Contura 430C performs fairly well as a Windows 95 machine, but it's still one of the slowest in its DX4-100 CPU class. Battery life is a respectable 4 hours and 46 minutes, which will just about get you across the country on a nonstop flight without having to replace battery packs. Compaq's notebook reliability and service are good, according to the results of our latest reader fax survey.

6 Acom Patriot 4000F

REVIEWED: November 1995

PROS: Good performer, low price

CONS: Generic manuals, poor sound quality, short battery life

Acom's $2120 Patriot 4000F is a four-door sedan of a notebook—equipped with most of the standard features and few extras. Ours came with a fixed 543MB hard drive and a 10.5-inch passive screen, plus two stacked PC Card Type II slots and a touchpad mouse. One drawback is short 2.7-hour battery life. But the Patriot cruises along faster than most other DX4-100s we tested.

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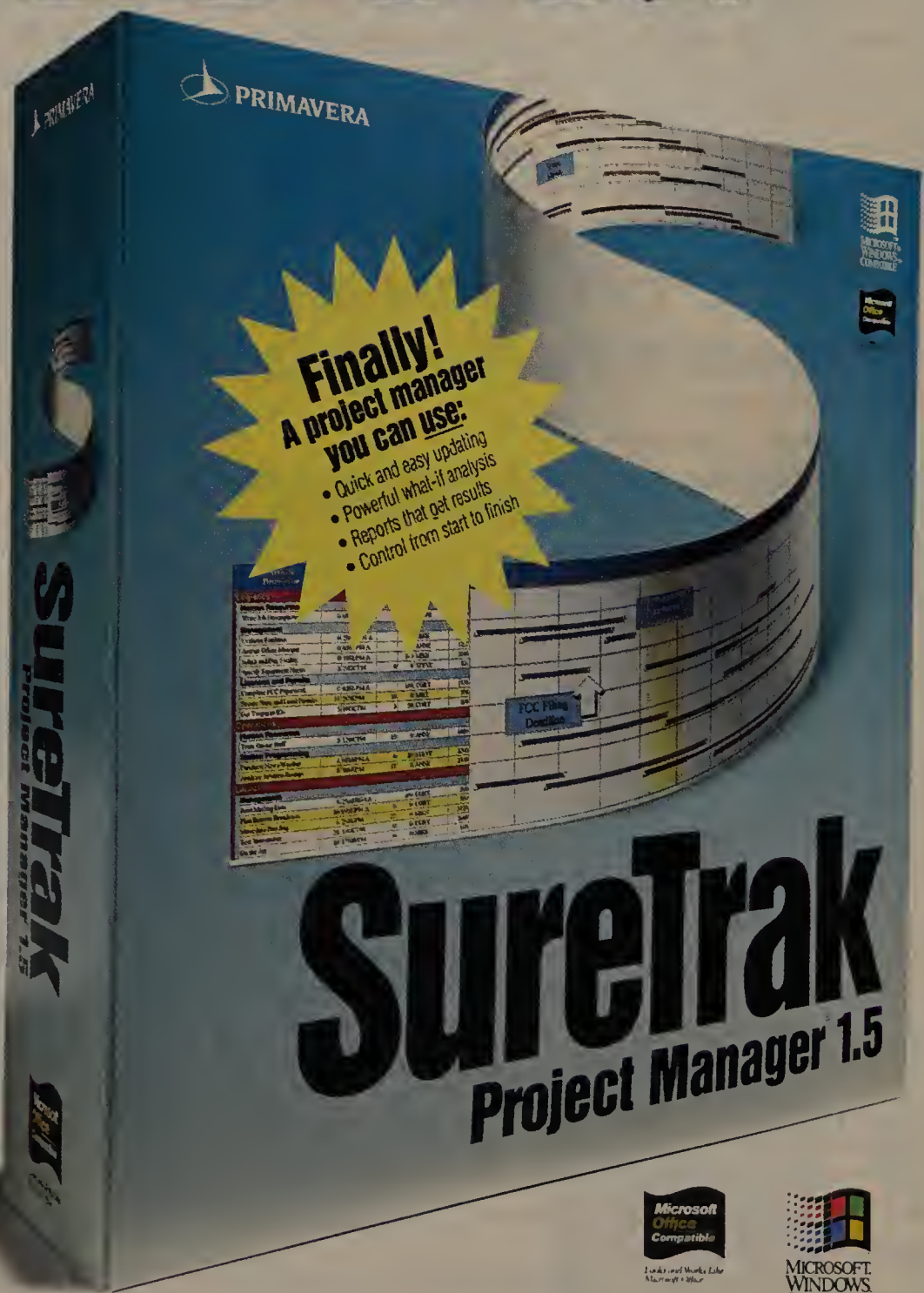

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The system's only extras are a floppy drive bay that can take a second battery for long flights, and built-in 16-bit audio. Unfortunately, the speaker sounds terrible. But a large palm rest on either side of the touchpad makes typing comfortable. Other than some basic utilities, the only bundled software is Windows 95. Acom's service and support policies rate a little below average.

7 Sharp PC-3050

REVIEWED: February 1996

PROS: Built-in sound, internal fax-modem

CONS: Sluggish performance, stiff keyboard

With its Cyrix 486DX2-66 processor and 8MB of RAM, Sharp's $2599 portable ran our new PC WorldBench tests as fast as some DX4-75s, making it suitable for travelers with no more than light computing needs. The PC-3050's 543MB hard drive and 10.3-inch dual-scan display are standard fare on low-cost portables, and the short 3.25-hour battery life will annoy long-distance travelers. But you do get built-in speakers and microphone, a 14.4-kbps fax-modem, an infrared port, and a generous software bundle. We haven't received enough responses from our ongoing reader fax survey to be able to comment on Sharp's service and system reliability record.

8 MPC TouchNote 1000

NEW THIS MONTH

PROS: Removable hard drive; inexpensive

CONS: Touchpad difficult to use

A reasonable $2165 price and several nice extras make this Pentium-75 notebook a good choice for the cost conscious, despite some below-average components. Not that it lacks any shortcomings. For one, while this is the first Pentium-based portable to make our budget chart, the 7.6-pound TouchNote didn't perform as well as some DX4-100 notes. Also, the 10.4-inch passive color screen, while large, has paler colors than we've come to expect on notebooks these days. Finally, the touchpad pointing device makes it difficult to use the otherwise comfortable keyboard. Despite these drawbacks, the TouchNote 1000 is still one of the fastest notebooks going according to our new PC WorldBench test suite, the battery life of 3.75 hours is fair, and you get built-in speakers and sound port, an infrared port, and a carrying case. The hard disk is 518MB, and you likely could improve performance noticeably by adding another 8MB of RAM.

9 NEC Versa 2000C

NEW THIS MONTH

PROS: Removable hard drive, internal fax-modem, reliable

CONS: Slow, even for a budget notebook

An almost $200 drop in price to $2599 gave NEC's Versa 2000C, the higher-end sibling of our number three machine, a shot at the budget chart this month. (It was number six on the power chart last month.) This DX4-75 notebook with 8MB of RAM is still a little expensive for most budget buyers, especially since you'll want to add at least another 8MB of RAM to get strong Windows 95 performance out of it. On the other hand, the Versa 2000C is one of the few units here with an internal fax-modem. Its screen is small for today's notebooks—only 9.5 inches—but this is also one of the few budget notebooks that has an active-matrix display. And although the hard drive size (540MB) could start to cramp some power users pretty quickly, the company's system reliability rates well. We would like to see a longer battery life than the 3.25 hours that we got running Windows 95 apps in our test. In short, the NEC Versa 2000C is a worthy budget notebook.

10 CTX EZBook 5x86-100

NEW THIS MONTH

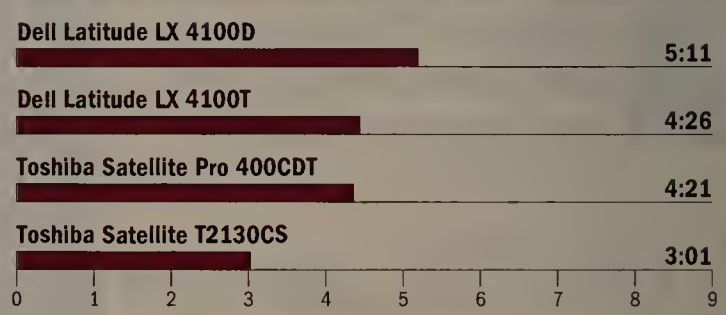
PROS: Very good touchpad, lots of RAM

CONS: Small 420MB hard drive

The new Cyrix 5x86 chips are turning up in systems that deliver good value for the money, and this CTX unit is no exception. The 100-MHz Cx586-based EZBook performed well in our PC WorldBench test suite thanks to 16MB of RAM, which helps a lot when working with Windows 95. The EZBook includes built-in stereo sound, a 10.4-inch active-matrix color screen, and a very responsive touchpad—all in a compact 7.8-pound case. As you'd expect, it features the usual notebook complement of features: a PC Card Type III slot and parallel, serial, and sound ports. The EZBook's only physical shortcoming, in our opinion, is its 420MB hard drive, which you can fill up in a hurry with today's ever-growing choice of software applications.

The EZBook's 3.7-hour battery life is decent, although not as long as we've come to expect from today's portable PCs. Perhaps the best feature, however, is its low $2599 price, which helps the EZBook claim the final budget spot on our Top 20 notebooks chart. CTX backs its system with a two-year warranty—longer than average for a notebook computer.

Battery Life for Best Buys



Time in hours:minutes.

Methodology
We drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Office workers use Windows 95 applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off.

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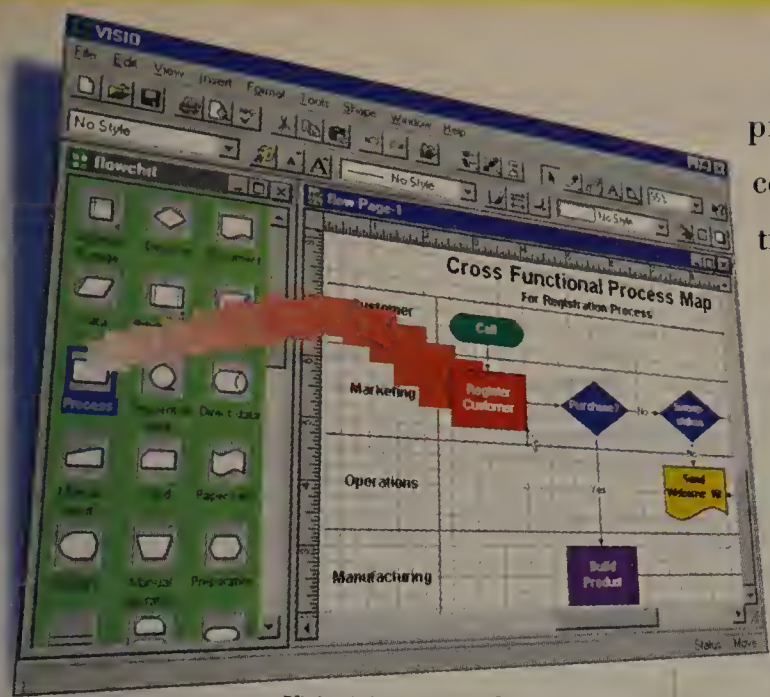

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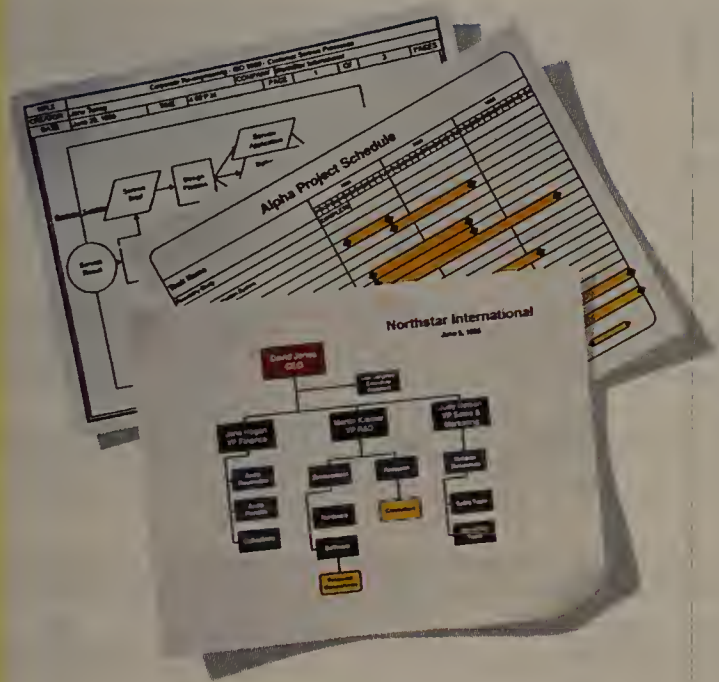

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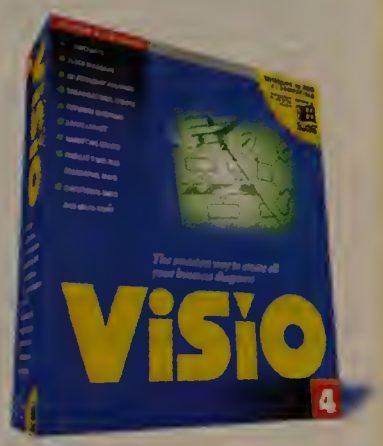

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This Month's Best Buys—Desktops

● = Yes ○ = No

n/a = not applicable

Standard features	CompuTrend Premio 5x86-100	Dell Dimension P75t	Dell Dimension XPS P120c	Dell Dimension XPS P133c	Dell OptiPlex GL+575	Gateway 2000 P5-75	Micron P120 Millennia
Street price as of 12/15/95 [1]	$1649	$2049	$2969	$3349	$2188	$1659	$2899
CPU	Cx5x86-100	Pentium-75	Pentium-120	Pentium-133	Pentium-75	Pentium-75	Pentium-120
CPU or upgrade socket	237-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF
BIOS	AMI 10/10/94	AMI 8/3/95	AMI 3/31/95	AMI 5/12/95	Phoenix v1.10 6/7/95	AMI 3/6/95	Phoenix 4.04 M5Hi-P17
Installed/maximum RAM (MB)	16/64	8/128	16/128	16/128	16/128	8/128	16/128
SIMM sockets/number free	3/1	4/2	4/2	4/2	4/2	4/2	4/2
Secondary RAM cache installed/ maximum (K)	256/512	0/256	512/512	512/512	0/256	0/0	256/256
Case style	compact	compact	minitower	minitower	pizza box	compact	minitower
Free externally accessible 3½-inch/ 5¼-inch drive bays	0/2	0/2	0/2	0/2	0/0	0/2	0/2
Free internal 3½-inch/5¼-inch drive bays	1/0	1/0	1/0	1/0	0/0	0/0	2/0
Free 16-bit ISA/8-bit ISA expansion slots	3/0 [2]	3/0 [2]	2/0 [2]	2/0 [2]	2/0 [2]	4/0 [2]	3/0 [2]
PCI or VL bus slots/number free	PCI/2 [2]	PCI/4 [2]	PCI/3 [2]	PCI/3 [2]	PCI/2 [2]	PCI/2 [2]	PCI/3 [2]
Hard disk	Quantum Fireball	Quantum Fireball	Quantum Fireball	Quantum Fireball	WD Caviar 2540	WD AC2850F	Conner CFA 1275A
Size (MB)	1080	540	1080	1080	540	853	1275
Adapter	integrated	Integrated	EIDE	EIDE	EIDE	integrated	EIDE
Floppy drives (MB)	1.44	1.44	1.44	1.44	1.44	1.44	1.44
Graphics adapter	Number Nine 9FX Motion531	S3 Trio64	Number Nine 9FX Motion771	Number Nine 9FX Motion771	S3 Trio64/64	ATI Technologies Mach 64	Diamond Stealth64 Video
Installed memory (MB)/ type	2/DRAM	2/DRAM	2/VRAM	2/VRAM	1/DRAM	2/DRAM	2/VRAM
Monitor	Premio FS62DU	Dell UltraScan V17X Color	Dell UltraScan 17LS	Dell UltraScan 17LS	Dell D1526T-HS	Vivitron 1572 CPQ15F13	Micron 15FGx
Tube/viewable diagonal (inches)	15/13.8	17/14.8	17/14.8	17/14.8	15/14.5	15/13.7	15/13.7
Dot pitch (mm)	.28	.26	.28	.28	.26	.25	.28
Modem speed for fax/data (kbps)	n/a	n/a	14.4/28.8	28.8/28.8	n/a	n/a	n/a
Sound board	Creative Labs Vibra 16	Creative Labs Vibra 16S	Creative Labs Vibra 16	Sound Blaster AWE32	n/a	n/a	Creative Labs Vibra 16
CD-ROM drive	Goldstar GCD-R540B	Mitsumi FX 400D	Mitsumi CRMC-FX400	NEC CDR-272	NEC CDR-272	Mitsumi FX400D	Sony CD476E
Data transfer rate (K/sec)	600	600	600	600	684	600	648
Parallel/serial/mouse/SCSI ports	1/2/0/0	1/2/1/0	1/2/1/0	1/2/1/0	1/2/1/0	1/2/1/0	1/2/1/0
Service and support							
Warranty for parts/labor (years)	2/2	3/1	3/1	3/1	3/3	3/1	3/1
30-day money-back guarantee	○	●	●	●	●	●	●
On-site service first-year price	$169 [3]	free	free	free	free	free	free
Repair turnaround policy (days at service center)	5	3	3	3	3	none	2
Daily toll-free phone support (hours)	10	24	24	24	24	24	24
Weekend support	○	●	●	●	●	●	●
Online support sites	BBS	BBS, AOL, CIS, WWW	BBS, AOL, CIS, WWW	BBS, AOL, CIS, WWW	BBS, AOL, CIS, WWW	AOL, BBS, Prod, CIS, WWW	BBS, WWW
Automated fax support	●	●	●	●	●	●	○

[1] All systems priced as configured with Windows 95, VGA and color monitor, keyboard, and mouse or other pointing device. Price is direct or based on vendor estimate.

[2] One less ISA slot available when all PCI slots are filled, and vice versa.

	Micron P133 Millennia	Micron P166 Millennia Plus	Vektron Multimedia P-100
	$3099	$4796	$1995
	Pentium-133	Pentium-166	Pentium-100
	320-pin ZIF	320-pin ZIF	320-pin ZIF
	Phoenix 9/14/95	Phoenix 10/27/95 4.04	Award v4.50GP 1/10/95
	16/128	16/128	16/128
	4/2	4/2	4/2
	256/256	256/256	256/256
	compact	minitower	minitower
	0/2	0/1	1/1
	1/0	1/0	0/0
	2/0 [2]	3/0 [2]	2/0 [2]
	PCI/3 [2]	4 PCI/2 [2]	PCI/3 [2]
	WD Caviar 31600	Quantum Grand Prix	Conner CFA 850A
	1624	2150	850
	EIDE	BusLogic SCSI	integrated
	1.44	1.44	1.44
	Diamond Stealth64 Video	Diamond Stealth64 Video	Diamond Stealth64 Video
	2/VRAM	2/VRAM	4/VRAM
	ADI MicroScan 4V	Micron 15FGx	ADI MicroScan 4V/LM-1564
	15/13.7	15/13.6	15/13.5
	.28	.28	.28
	n/a	n/a	14.4/14.4
	Sound Blaster 16	Sound Blaster AWE32	Creative Labs Vibra 16
	Sony CDV760	Plextor PX-63CS	Toshiba XM-5302B
	648	900	600
	1/2/1/0	1/2/1/1	1/2/0/0
	3/1	3/1	1/1
	●	●	●
	free	free	$50
	2	2	3
	24	24	11
	●	●	● [4]
	BBS, WWW	BBS, WWW	BBS, CIS, WWW
	○	○	●

[3] Four-year on-site service package only.

[4] Saturdays only.

Standard features	Dell Latitude LX 4100D	Dell Latitude LX 4100T	Toshiba Satellite Pro 400CDT	Toshiba Satellite T2130CS
Street price as of 12/15/95 [1]	$2299	$2979	$4078	$1999
CPU	DX4-100	DX4-100	Pentium-75	DX4-75
Traveling weight (pounds) [2]	7.2	7.2	9	7.2
Width x depth x height (inches)	10.4 x 8.7 x 1.8	10.4 x 8.6 x 1.8	11.8 x 9.2 x 2.2	11.7 x 8.9 x 2.2
Installed/maximum RAM (MB)	8/40	16/20	16/40	8/32
Secondary RAM cache installed/maximum (K)	128/128	128/128	0/0	0/0
Installed/maximum hard disk (MB)	420/810	810/810	810/810	520/520
Removable hard disk	●	●	○	○
Screen type	color dual-scan	color active	color active	color dual-scan
Viewable screen diagonal (inches)	10.3	10.3	10.4	10.5
Maximum screen colors	65,536	65,536	16.8 million	256
Simultaneous LCD screen and external monitor	●	●	●	○
Highest resolution of external monitor	1024 x 768	1024 x 768	1024 x 768	1024 x 768
Mouse/keyboard ports	●/○	●/● [3]	○/●	●/● [3]
Cursor keys in inverted T	●	●	●	●
Dedicated page-control keys	○	●	●	●
All 12 function keys dedicated	●	●	●	●
Standard <Ctrl> and <Alt> layout	○	○	○	○
Built-in pointing device	●	●	●	●
Fax/data modem speed (kbps)	14.4/14.4	n/a	n/a	n/a
Docking station available	○	○	○ [4]	○
PC Card slots Type II/III	0/1 [5]	2/0 [5]	2/1 [5]	2/1 [5]
Power management				
Type of battery	NiMH	NiMH	lithium ion	NiMH
Suspend button	●	●	●	●
Suspends when case closed	○	○	●	○
Service and support				
Warranty for parts/labor (years)	3/1	3/1	3/3	1/1
30-day money-back guarantee	●	●	●	●
On-site/replacement service first-year price	free	free	n/a	n/a
Repair turnaround policy (days at service center)	○	○	[6]	[6]
Daily toll-free phone support (hours)	24	24	24	24
Weekend support	●	●	●	●
Online support sites	BBS, WWW, AOL, CIS	BBS, WWW, AOL, CIS	BBS, WWW, CIS	BBS, WWW, CIS
Automated fax support	●	●	●	●

[1] All notebooks priced as configured with Windows 95, VGA monochrome or better display, and mouse or other pointing device. Street price is direct or based on vendor estimate.

[2] Includes computer, adapter, power cord, and external floppy drive if notebook has one.

[3] Mouse port doubles as keyboard port.

[4] Port replicator available.

[5] Type III slot alternatively accepts two Type II devices.

[6] $50 per year for 2-day turnaround.

continued from pg. 106 rating is based—a change that will make it much easier to tell how fast a PC is by looking at its WorldBench score (see "PC WorldBench: A Number You Can Identify With").

Different prices also changed the rankings—sometimes dramatically—of previously reviewed models. Some prices shot up several hundred dollars because the vendors beefed up their PCs' configurations, for example adding RAM (we're seeing many more 16MB PCs) and replacing small hard drives with bigger ones. For instance, a $700 jump in street price made Dell's Latitude LX 4100T suddenly ineligible for the budget notebook chart, where it was number four last month. Now, with an 810MB hard drive and 16MB of RAM, it's our number two power notebook.

This Month's Best Buys

In the Windows 95–based PC WorldBench, systems are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from six tests.

Methodology We test each system as supplied by the manufacturer. All tests are performed under Windows 95 configured with an HP LaserJet IV as the default printer. We disable any power-saving features. We set the video resolution to 800 by 600 in 256 colors, using the supplied video driver where possible. We load the test applications and files and the test automation software and scripts.

Word 7.0 for Windows 95 (25 percent of weighting)
We open multiple documents, format text, copy and paste, close files, scroll, and save files. We also change document views, insert text, check spelling, repaginate, count words, print preview, and mail merge.

Excel 7.0 for Windows 95 (20 percent)
Same functions as the 1-2-3 test.

Paradox 5.0 for Windows (15 percent)
We simulate an order entry system. We import tables and post a series of orders, looking up customer and product data in the process. We perform a variety of queries, edit data, and create reports.

WordPerfect 6.1 for Windows (15 percent)
We open different-size files, search for text, change fonts, enter text, save files, and jump to a particular page. We also check spelling, copy and paste, scroll, change document views, and insert one file into another.

1-2-3 release 5 for Windows (10 percent)
Using a variety of spreadsheets including an automobile statistics sheet, a multisheet federal income tax workbook, a variable-rate mortgage spreadsheet, and an analysis of life insurance policies, we perform common functions and tasks including opening a file, formatting, data entry, sorting, recalculation, data query, print preview, printing, and saving the file.

Picture Publisher 6.0 for Windows 95 (15 percent)
Using an assortment of graphics, we perform functions including opening and saving files, zooming, scrolling, palette changes, posterization, image masking, hue shifting, feathering, and copying and pasting.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

RELIABILITY AND SERVICE MONITOR

Win a Compaq ProLinea 575e

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Compaq ProLinea 575e, a Pentium-75 PC in this month's Top 20.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE. Fax your completed survey to 415/357-4522. Do NOT fax a cover page. Or mail it to Fax Survey, Box 3-SS, *PC World*, 501 Second St. #600, San Francisco, CA 94107-1496. Surveys must be received by March 31.
PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.
HOW TO FILL OUT THE FORM: Print your name (block capital letters) and your fax number, and fill the circles for each digit of your daytime phone number. Then fill out the questionnaire. AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

How did you get this copy of *PC World*?
○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Apple ○ AST ○ AT&T (NCR) ○ Austin (IPC) ○ Axik ○ Blackship ○ Canon ○ Compaq ○ CompuAdd
○ Compudyne ○ Computrend ○ Comtrade ○ Cornell ○ CTX ○ Dell ○ Diamond ○ Digital (DEC) ○ DTK ○ EPS ○ Epson ○ Everex
○ Future Tech ○ Gateway 2000 ○ Hewlett-Packard ○ HiQ ○ Hyundai ○ IBM ○ Insight ○ Intelesys ○ Leading Edge ○ Micro Express ○ Micron ○ Midwest Micro
○ MIS ○ NEC ○ Netis ○ Packard Bell ○ Panasonic ○ PerComp ○ Pionex ○ Polywell ○ Quantex ○ Robotech ○ Samsung ○ Sharp
○ Swan ○ Tangent ○ Texas Instruments ○ Toshiba ○ Twinhead ○ USA Flex ○ VTech (Expotech, Laser) ○ WinBook ○ Zenith (ZDS) ○ Zenon ○ Zeos ○ Other

What size is this PC?
○ Desktop ○ Notebook/laptop ○ Handheld

What is the CPU?
○ PowerPC ○ Pentium ○ 80486 ○ 80386 ○ Other

Where did you buy this PC?
○ Local dealer ○ Mail/phone order ○ Direct from field sales force ○ Membership discount store ○ Computer superstore ○ Home electronics store ○ Retail store ○ Value-added reseller ○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week ○ 1–2 weeks ○ 3–4 weeks ○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR ○ Staff computer technician ○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)
○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 91 ○ 92 ○ 93 ○ 94 ○ 95 ○ 96

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Please answer for the most recent problem—*other than DOA*—not reported in a previous survey.

When did this problem occur? (Specify month and year.)
○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 91 ○ 92 ○ 93 ○ 94 ○ 95 ○ 96

How long was this after you purchased your PC?
○ Less than 1 month ○ 1–3 months ○ 4–6 months ○ 7–12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer ○ Dealer/store where purchased ○ Manufacturer's authorized repair technician ○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store ○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1–2 minutes ○ 3–5 minutes ○ 6–10 minutes ○ 11–20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes–1 hour ○ 2–5 hours ○ 6–10 hours ○ 11–24 hours ○ 1½–2 days ○ 3–5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1–2 days ○ 3–7 days ○ 8–14 days ○ 15–30 days ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was the problem resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

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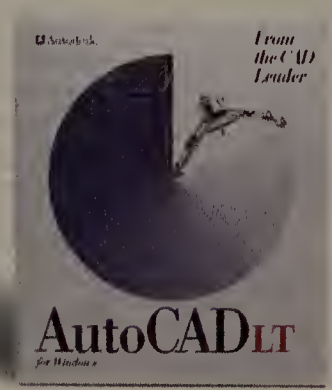
And one inexpensive one.



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Lasers From Lexmark: Faster, Cheaper, and Sharper

Even Better Than Before
The upgrade to our former Best Buy, the Lexmark Optra R+ now comes with a 16-ppm engine for significantly faster printing.

Lexmark made the biggest splash on this month's Top 10 Workgroup Printers chart: All three of the company's new lasers we tested earned a place on our list. The terrific print quality of the Optra C, Lexmark's first color laser, helped it grab the number three spot on our color chart—a place recently vacated by the Xerox 4900 laser, which Xerox is no longer selling. The two other Lexmark printers we tested—the Optra R+ and Optra Lx+, which earned the top two places on the monochrome chart—are upgrades of models we reviewed last year.

The rest of the Top 10 remains unchanged. The HP DeskJet 1600CM, an ink jet printer, is still the Best Buy on the color chart, due primarily to its outstanding price and fast color print speed, plus good (if not quite laser-quality) output.

Monochrome Magic

Lexmark's new generation of monochrome Optras all have 16-pages-per-minute engines. This is a step up for Lexmark's R line of printers, which formerly had 12-ppm engines. With the same exterior design and excellent drivers and documentation, the Optra R+ and Lx+ we tested retain the same high output quality and ease-of-use scores as their predecessors.

Your choice between the R and L Optra lines depends on your office's printing habits. The second-place Optra Lx+ is a high-capacity printer, with 4MB of RAM and a tray for 500 sheets of paper—and its $2299 price is $200 less than that of the Lx it replaced. The entry-level, $1450 Optra R+ has 2MB of RAM and a 200-sheet input tray. Both Optras can handle a bevy of additional paper-handling options, including duplex printing. These options are standard on spin-offs from the base models, which we did not test: The $1649 Optra Rt+ has two 200-sheet

TOP 10 WORKGROUP PRINTERS

	Last ranking	First reviewed	Type	Street price [1]	Overall rating	Output rating: Monochrome	Output rating: Color	Speed rating: Monochrome	Speed rating: Color	Features, ease-of-use rating	Reader service number	Comments
MONOCHROME												
1 Lexmark Optra R+ 800/891-0331	–	current	laser	$1450	89	78	–	86	–	82	611	Entry-level Optra is faster than before.
2 Lexmark Optra Lx+ 800/891-0331	–	current	laser	$2299	84	78	–	85	–	85	612	High-end Optra has more RAM and 500-sheet input.
3 Texas Instruments microLaser PowerPro 800/848-3927	2	Nov 95	laser	$1660	83	75	–	77	–	76	613	600 dpi, 12 ppm, fast, Apple LocalTalk standard.
4 Okidata OL1200 800/654-3282	4	Nov 95	laser	$1199	83	76	–	76	–	64	614	Inexpensive, comes with PostScript.
5 Brother HL-960 800/276-7746	5	Nov 95	laser	$999	82	73	–	49	–	72	615	Needs external networking device, lacks PostScript.
6 HP LaserJet 4MPlus 800/752-0900	6	Jan 96	laser	$1899	81	74	–	75	–	85	616	Network ready, 600 dpi, 12 ppm.
7 HP LaserJet 4MV 800/752-0900	7	Jan 96	laser	$2916	81	71	–	95	–	84	617	Network ready, 16 ppm, prints full bleed at 11 x 17.
COLOR												
1 HP DeskJet 1600CM 800/752-0900	1	Nov 95	Ink jet	$1999	76	63	57	29	81	75	618	Low cost; good plain-paper printing. A winner.
2 Apple Color LaserWriter 12/600 PS 800/538-9696	2	Nov 95	laser	$6499	73	85	85	23	47	82	619	Very slow, but superior output. PostScript only.
3 Lexmark Optra C 800/358-5835	–	current	laser	$6400	73	85	85	30	30	78	620	Slowest color printer, but excellent output.

[1] Based on vendor estimates and PC World research.

BEST BUY

Methodology To determine overall rating, we weight output quality and features (which includes hands-on testing) the most heavily, followed by price, support policies, performance, and consumables. For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 902.

input trays, and the $2999 Lxi+ comes with 8MB of RAM, two 500-sheet input trays, and Ethernet.

The Optras' true 1200-dots-per-inch resolution is not simulated (as many others are) by varying dot size and placement, tweaking the laser beam frequency, or changing the drum speed. However, you can print in this near photographic quality only if your Optra has a minimum of 8MB of RAM. The Lxi+ is 1200-dpi out of the box, but with standard memory (as we tested them) both the Optra R+ and the Optra Lx+ print at 600-dpi resolution; memory upgrades from Lexmark start at $199 for 2MB of RAM.

Lexmark's Debut Color Laser *The Optra C, the first color laser from Lexmark, printed color pages slowly compared to its peers, but the excellent output quality—equal to that of the Apple laser—is well worth the wait.*

Lexmark's New Color Laser

The Lexmark Optra C, which debuts in third place on our color chart, is based on the same 600-dpi, 12-ppm monochrome/3-ppm color Canon engine that the Apple Color LaserWriter 12/600 PS uses, which explains why the Optra C matched the second-place Apple's top-rated output. The Apple comes with more networking features standard, but the Optra C is otherwise a close contender.

Like all of the color lasers we've tested, the Optra C is slow compared to monochrome printers. It was also the slowest printer we've tested so far at printing color documents. But notably, the Optra C is the first color desktop printer we've seen that has stochastic screening, a technology usually found on high-end imagesetter devices. Stochastic screening helps eliminate the troublesome moiré patterns that are a common by-product of image scanning. Unfortunately, Lexmark's stochastic screening option made our Photoshop 3.0 test image look smudged instead of sharper. Lexmark admitted that it's still fine-tuning this feature, and it may work better with some images and applications than others.

An Apple Laser With Good Connections

Apple's new 16-ppm monochrome LaserWriter 16/600 PS didn't make the chart, but it's a versatile machine with a moderate $1943 price. It connects to PC, UNIX, and Macintosh networks through its standard Ethernet and LocalTalk ports. It also has a SCSI port for attaching external hard drives to store faxes from the optional PostScript fax board. Output quality was terrific, with sharp line art and clean text. Its print speed, however, was only average compared to other monochrome printers we've tested.

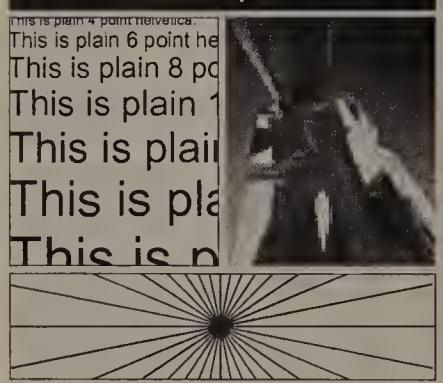
Another printer that missed the chart was Kyocera's FS-1550A. The Kyocera is one of the most compact workgroup printers you'll find, and with a street price of $1349, it's relatively inexpensive. Its paper handling is versatile, too: The 250-sheet standard paper capacity is typical for a workgroup printer, but Kyocera also offers trays that stack beneath the printer and hold up to 1000 additional sheets. The overall print quality was good, especially in text, but its maximum 300-dpi resolution produces grid-like patterns that result in poor-quality line art and gray-scale images. Also, it printed slowly compared to other monochrome contenders.

—Bill Underwood

Bill Underwood specializes in printer design, evaluation, and manufacturing. Testing performed by Ulrike Diehlmann of the PC World Test Center.

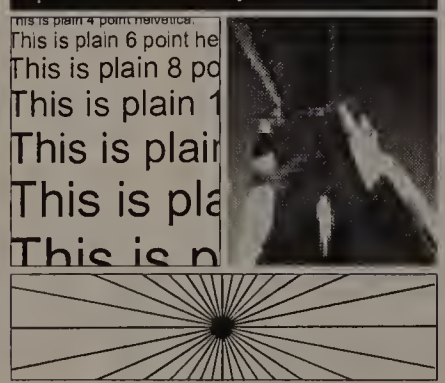
OUTPUT QUALITY SAMPLES Lexmark's New Optras Make a Great First Impression

Lexmark Optra R+



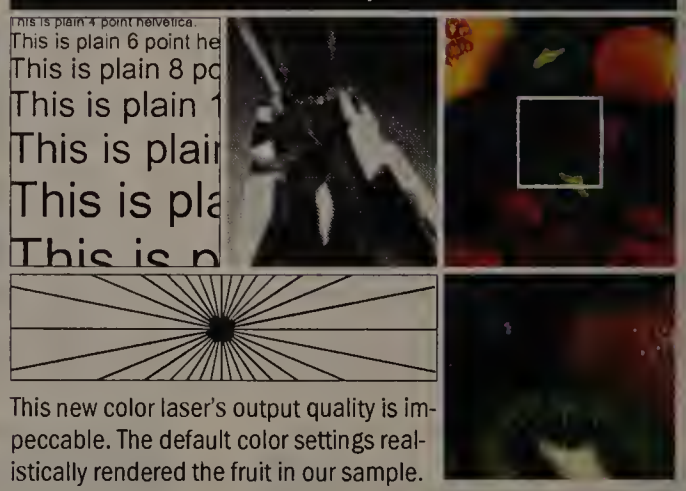
The Best Buy Optra R+ has superior print quality, with legible text down to 4-point size, crisp line art, and good gray-scale.

Lexmark Optra Lx+



The output quality of the Optra Lx+ is identical to that of the Optra R+—not surprising, since they use the same engine.

Lexmark Optra C



This new color laser's output quality is impeccable. The default color settings realistically rendered the fruit in our sample.

Connectix

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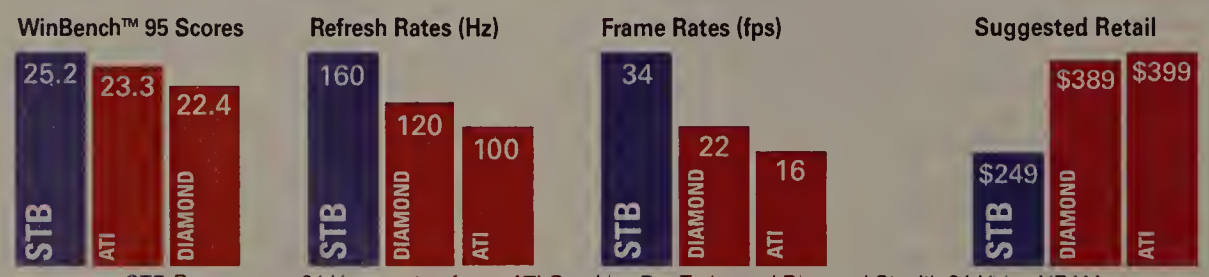

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Circle 210 on reader service card

ADI's MicroScan Pivots Into Place

Built to Tilt *Corner grips on the ADI MicroScan 17X make it easy to swivel the tube from horizontal to full-page position or vice versa.*

If you need to see entire documents without scrolling, or want a large monitor for Web or print publishing, ADI's MicroScan 17X, debuting this month, is a nice alternative to a 21-inch monitor.

Simply grab a corner of this $859 17-inch unit and rotate the picture 90 degrees so the screen fits your page—software drivers kick in automatically and change the display from landscape to portrait mode. The vertical viewing height is comparable to what you'd get viewing a full page on a 21-inch monitor. For focused text and vivid graphics, this monitor does better than average, though not as well as many of the monitors listed higher on our chart. The MicroScan 17X doesn't use on-screen controls, but it has a sweeping arc of control buttons below the screen that are easy to adjust. It also supports Level 2b Plug and Play and offers high refresh rates at 800 by 600 resolution and standard rates at 1024 by 768. We have some gripes: Each time the tube is rotated, you must press a hot key so the picture appears in the correct orientation, and then manually degauss the monitor so the tube is demagnetized and free of image distortion.

Significant Others

This month we also tested Hewlett-Packard's UltraVGA 1280, the Nokia Valuegraph 447W, the Smile CB1716SL, and the Wyse WY-17E. All four of these monitors offer Level 2b Plug and Play and a full array of controls through on-screen menus, but mediocre text and graphics scores kept them off the Top 10.

Of this group, only the $845 Nokia 447W offers built-in speakers. Unlike other monitors capable of multimedia, this one features headphone and micro-

TOP 10

17-INCH MONITORS

	Last ranking	First reviewed	Street price	Overall rating	Text quality rating	Graphics quality rating	Features, ease-of-use rating	Dot or stripe pitch (mm)	Max. refresh rate at 800 X 600 (Hz)	Reader service number	Comments
1 Nanao FlexScan F2-17 800/800-5202	1	Nov 95	$970	85	81	71	83	dot 0.28	110	621	Great text detail, Level 2b Plug and Play[1], on-screen controls, screen adjustment software.
2 NEC MultiSync XV17 800/632-4636	2	Nov 95	$799	85	79	74	71	dot 0.28	76	622	Crisp text, good price, Level 1 PnP, screen adjustment software, standard refresh.
3 Mitsubishi Diamond Pro 17TX 800/843-2515	3	Nov 95	$1073	83	76	72	85	dot 0.25	120	623	Level 2b PnP, high refresh, screen adjustment software, on-screen menu controls, expensive.
4 MAG InnoVision MXP17F 800/827-3998	4	Nov 95	$930	82	76	85	67	dot 0.26	120	624	Top graphics, 16-inch viewable area, fast refresh, no PnP or on-screen menu controls.
5 ViewSonic 17PS 800/888-8583	5	Nov 95	$995	82	72	77	76	dot 0.25	128	625	Good graphics, Level 2b PnP, high refresh, software for adjusting colors.
6 Princeton Graphic Systems Ultra 17 800/747-6249	7	Nov 95	$620	81	72	79	49	dot 0.28	90	626	Low price, good graphics, very good refresh, no PnP or on-screen menu controls.
7 Nokia Multigraph 447X 800/296-6542	8	Nov 95	$999	81	76	83	67	dot 0.28	110	627	Excellent graphics, software for adjusting colors, on-screen controls, no PnP.
8 Nokia Valuegraph 447L 800/296-6542	9	Nov 95	$695	81	62	82	60	dot 0.26	85	628	Good price, excellent graphics, standard refresh, so-so text, no PnP or on-screen controls.
9 Panasonic PanaMedia 17 800/742-8086	10	Nov 95	$800	80	72	68	69	dot 0.27	107	629	Mike and speakers, Level 2b PnP, on-screen controls, 16-inch viewable area, OK graphics.
10 ADI MicroScan 17X 800/228-0530	–	current	$859	78	72	75	61	dot 0.28	100	630	Good display, pivoting screen, easy controls, Level 2b PnP, requires frequent degauss.

[1] Plug and Play Level 1 sends monitor settings to graphics card; Level 2b adds a bidirectional capability between graphics card and monitor.

BEST BUY

Methodology We tested the monitors at a resolution of 800 by 600 dpi, set at 65,536 colors and a refresh rate of 72 Hz. We used a Pentium-90 PC with 16MB of RAM and a Diamond Stealth 64 PCI graphics card with 2MB of DRAM. Display quality accounts for 50 percent of the overall rating; price, 20 percent; features, 25 percent; and service and support, 5 percent. For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 903.

phone jacks conveniently located on the front instead of in the back. That means you don't have to reach behind your PC to plug in headphones, and you can add additional speakers and separate them for a wider dynamic sound range.

Because the 447W has a 0.26mm dot pitch, good refresh rates at higher resolutions, and Colorific image adjustment software, we expected better display scores—particularly with text. This is also the only monitor without simple contrast and brightness buttons on the front panel. If lighting changes in your work area, instead of tweaking with a knob you must go to on-screen menus, highlight the control, and make the adjustment. Fortunately, we didn't have to hunt far in the menu to make the changes.

Sony Regroups

Sony no longer sells the Multiscan 17sf, which was number six on the chart in November, so we dropped it from our chart. Its replacement, the 17sf II, is still $899; the preproduction unit we saw supports Level 2b Plug and Play and uses an on-screen menu to show you the exact level of each adjustment you make with the control panel buttons. We'll include it in our next roundup of 17-inch monitors in June. Next month we'll recap the 15-inch monitor market.

—John Goddard

At normal levels the speakers inside Nokia's 447W sound hollow; crank up the volume and the screen wiggles. It can handle business audio, but not music.

MULTIMEDIA MONITORS Look Better Than They Sound?

Built-in speakers make a monitor "multimedia," but is the convenience and sound worth the extra money? It depends on how much you value high-quality audio. Targeted to the disheveled business desktop and claustrophobic home office space, built-in speakers may eliminate a knot of cables and free up room for another dirty coffee cup. But for audiophiles, external speakers still offer greater volume, less sound distortion, broader stereophonic range, and deeper bass—without risk of image jiggle.

To see how well multimedia monitors handle a range of audio, we informally tested five monitors equipped with built-in speakers: the IBM 17S/S, the Nokia Valuegraph 447W, the Panasonic PanaMedia 17, the Tatung Audio 15, and the ViewSonic 17GA. Windows 95 sound clips sounded fine on all the monitors. But when we popped in a favorite music CD, the stereo quality rivaled cranking up the radio in a Volkswagen.

On the bright side, multimedia monitors don't cost much more than comparable monitors without speakers. Even monitors such as the PanaMedia 17 and the ViewSonic 17GA, which also come with built-in microphones for videoconferencing and voice activation software, cost only about $50 more.

Why don't multimedia monitors sound better? Good audio quality depends on the strength of the magnetic field generated by speakers, which can distort a monitor's display if they're not shielded effectively. To counter this, most integrated speakers allow only a low level of amplification and little, if any, bass tones. Design changes such as positioning speakers sideways, downwards, or below the monitor can lessen image distortion, but the trade-off is usually muffled monotone sound. Several vendors are considering special external speakers such as woofers that fit around the base of the monitor, where sound vibration is least likely to distort the display.

Multimedia monitors integrate sight and sound—but if hearing is as important as seeing, wait a few months until better speakers appear.

This may be fine for business users, who are prone to wearing headphones in a shared office anyway, but home users—who are more finicky with their dollars—expect CD-quality sound for games and multimedia titles. Ease of use is important, but they also want the best sound quality possible, says Treg Tyler, a marketing manager at Sony, which offers a variety of external and attachable speakers. These users will probably want to hold off buying sound-equipped monitors until better speakers become more affordable.

For the moment, not all monitors offer multimedia, but Bryan Fedrow, market analyst at Stanford Resources (publisher of *Monitrak*), expects that "everyone's going to jump in at some point" with more sophisticated components. Last year Panasonic touted a sleek entertainment monitor called the Galileo—sporting infrared headphones and a detachable woofer to enhance bass—but it's still unclear when or if this unit will appear on the U.S. market. That's okay, according to a recent *PC World* reader survey. When it comes to monitors, multimedia capabilities are at the bottom of consumers' wish lists; image quality and price still matter most.

—Angela Freeman

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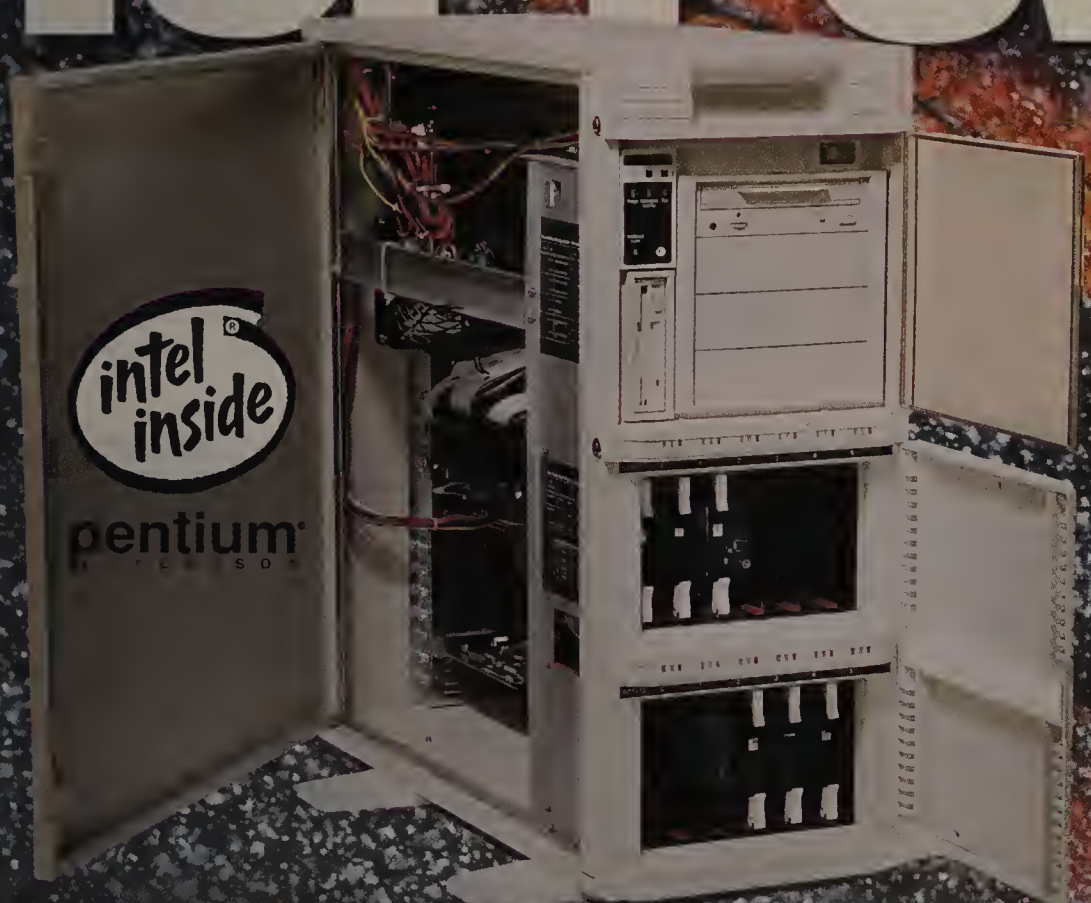

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• 16-Bit ISA Video	• 16-Bit ISA Video	• 16-Bit ISA Video
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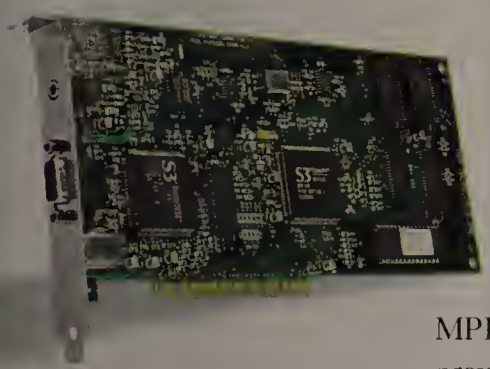
Circle 144 on reader service card

All-In-One Boca Board: Fast MPEG, Slow Graphics



The Great MPEG Trade-Off
If you want the kind of video playback you can get from boards like the Boca Voyager Movie Player, you have to give up a little application speed.

Let's talk MPEG for a minute. It's considered the best standard for viewing video clips on a PC, but it requires a lot of horsepower. All the boards in this month's Top 10 can play full-screen MPEG clips using bundled software, but you need a fast Pentium to enjoy good playback. New, low-cost hardware MPEG decoders work faster than software solutions, providing the best full-motion video.

The $349 Boca Voyager Movie Player, one of three new boards we tested this month that didn't make the chart, has a built-in MPEG decoder plus surround sound. Unfortunately, it has the same problem as other boards with integrated MPEG hardware we've reviewed—slow Windows performance. But the biggest reason the Voyager Movie Player missed the chart is its lack of software utilities. Boca normally bundles Binar Graphics' reputable AnyView utilities, but not with this board.

The two other boards we tested this month come with MPEG playback software, but like the Voyager Movie Player, neither cracked our Top 10. The $249 Actix GraphicsEngine Ultra 64 AV, with 2MB of VRAM, is the best performer of the three, especially in business applications. However, in graphics applications it couldn't keep up with the boards in our Top 10, and its software utilities are sparse.

The third board, Orchid's $199 Kelvin Video64 with 2MB of DRAM, is just plain slow. We like its software utilities and simple installation program, but it is the slowest board we've ever tested in both business and graphics applications.

Of the boards in this month's Top 10, only the Hercules Terminator Professional climbed higher on the chart. With its street price dropping to $279, the Terminator Professional advanced to number four.

TOP 10 GRAPHICS BOARDS

Last ranking		First reviewed	Street price	Overall rating	Performance ratings: Business applications	Performance ratings: Graphics applications	Max. refresh rate at 1024 x 768 (Hz)	Chip/installed RAM (MB)/type	Reader service number	Comments
1	Diamond Stealth64 Video 3200 800/468-5846	1	Sept 95	$269	84	80	85	120	S3 Vision968/ 2/VRAM	601	Fastest in the Top 10; good price, but less software than XL models.
2	STB Powergraph 64 Video 214/234-8750	2	Jan 96	$249	82	76	78	120	S3 Trio64V+/ 2/DRAM	602	Uses EDO DRAM to speed up business apps for less than VRAM.
3	Diamond Stealth64 Video 2201XL 800/468-5846	3	Nov 95	$233	81	72	85	100	S3 Trio64V+/ 2/DRAM	603	Speed in graphics apps is excellent for a DRAM board.
4	Hercules Terminator Professional 800/532-0600	6	Jan 96	$279	81	78	81	120	S3 Vision968/ 2/VRAM	604	Great performance, excellent software utilities, but poor install routine.
5	Matrox MGA Millennium 800/361-1408	4	July 95	$329	80	72	87	120	MGA-2064W/ 2/WRAM	605	Tops in graphics; 3-D acceleration, good software bundle; no VL version.
6	STB Velocity 64 Video 214/234-8750	5	July 95	$279	80	74	81	120	S3 Vision968/ 2/VRAM	606	Better score in graphics apps than #2 may be due to high-speed VRAM.
7	VideoLogic GrafixStar 700 800/578-5644	7	Oct 95	$249	80	78	79	100	S3 Vision968/ 2/VRAM	607	Uses fast but nonstandard VESA Media Channel to attach add-in cards.
8	Diamond Stealth64 Video 2200XL 800/468-5846	8	July 95	$233	79	72	82	100	S3 Vision868/ 2/DRAM	608	Solid in graphics apps, weekend support on all cards.
9	ATI Graphics Xpression 905/882-2600 ext. 1	9	Sept 94	$174	79	65	78	75	ATI Mach64/ 2/DRAM	609	Good overall value, strong software utilities; slow in business apps.
10	Number Nine 9FX Motion771 800/438-6463	10	July 95	$290	79	78	78	150	S3 Vision968/ 2/VRAM	610	Fast in business apps; high refresh rates, top-notch software utilities.

Windows Integrated Test Suite was developed by Jon Peddie Associates, a PC graphics consulting firm.

BEST BUY

Methodology We tested boards at 1024 by 768 resolution at 256 colors and at 800 by 600 resolution at 16.8 million colors. The business applications rating consists of WITS scores for Word 2.0 for Windows, Excel 4.0, and Freelance Graphics 2.01 running in 8-bit mode, and for Freelance running in 24-bit mode. The graphics applications rating consists of WITS scores for CorelDraw 3.0, PhotoStyler 1.1, and QuarkXPress 3.11 running in 8-bit and 24-bit modes. The overall rating balances performance, street price, features, and support policies. For all ratings, higher is better.

Windows 95–certified Plug and Play.

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AD2940W WIDE $289.00

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TOSHIBA

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PX63CS 6 Speed Internal SCSI $399.00

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US Robotics 14.4k $109.00
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Cirrus Logic w/Voice 14.4k $99.00
US Robotics 14.4k $109.00
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CFS1275A	1.27GIG	12ms	$255.00
CFS1621A	1.62GIG	12ms	$299.00
CONNER SCSI HARD DRIVES			
CFP1080S	1.08GIG	9.5ms	$329.00
CFP2105S	2.14GIG	8.5ms	$649.00
CFP4207S	4.29GIG	9ms	$1090.00
SEAGATE HARD DRIVES			
ST5850A	850MB	11ms	$235.00
ST31220A	1.20GIG	9ms	$276.00
SEAGATE SCSI HARD DRIVES			
ST31230N	1.20GIG	9ms	$430.00
ST32430N	2.14GIG	9ms	$780.00
ST32550N	2.50GIG	11ms	$965.00
MAXTOR IDE HARD DRIVES			
MAX7540AV	540MB	12ms	$175.00
MAX7850AV	850MB	12ms	$194.00
MAX71260A	1.26GIG	12ms	$284.00
MAX71626A	1.60GIG	12ms	$325.00
WESTERN DIGITAL IDE HARD DRIVES			
WD2635A	635MB	11ms	$175.00
WD2850A	853MB	11ms	$194.00
WDAC2100	1.08GIG	12ms	$229.00
WDAC31200	1.2 GIG	10ms	$275.00
WDAC31600	1.6 GIG	9ms	$355.00
QUANTUM IDE HARD DRIVES			
FB5408A	540MB	14ms	$163.00
LT730A	730MB	12ms	$175.00
FB1080A	1.08GIG	12ms	$295.00

VIDEO CARDS

DIAMOND

Stealth64 1MB PCI/VLB (D-Ram) $125.00
Stealth64 2MB PCI/VLB (D-Ram) $175.00
Stealth64 2MB PCI/VLB (V-Ram) $265.00
Stealth64 4MB PCI/VLB (V-Ram) $420.00

MATROX

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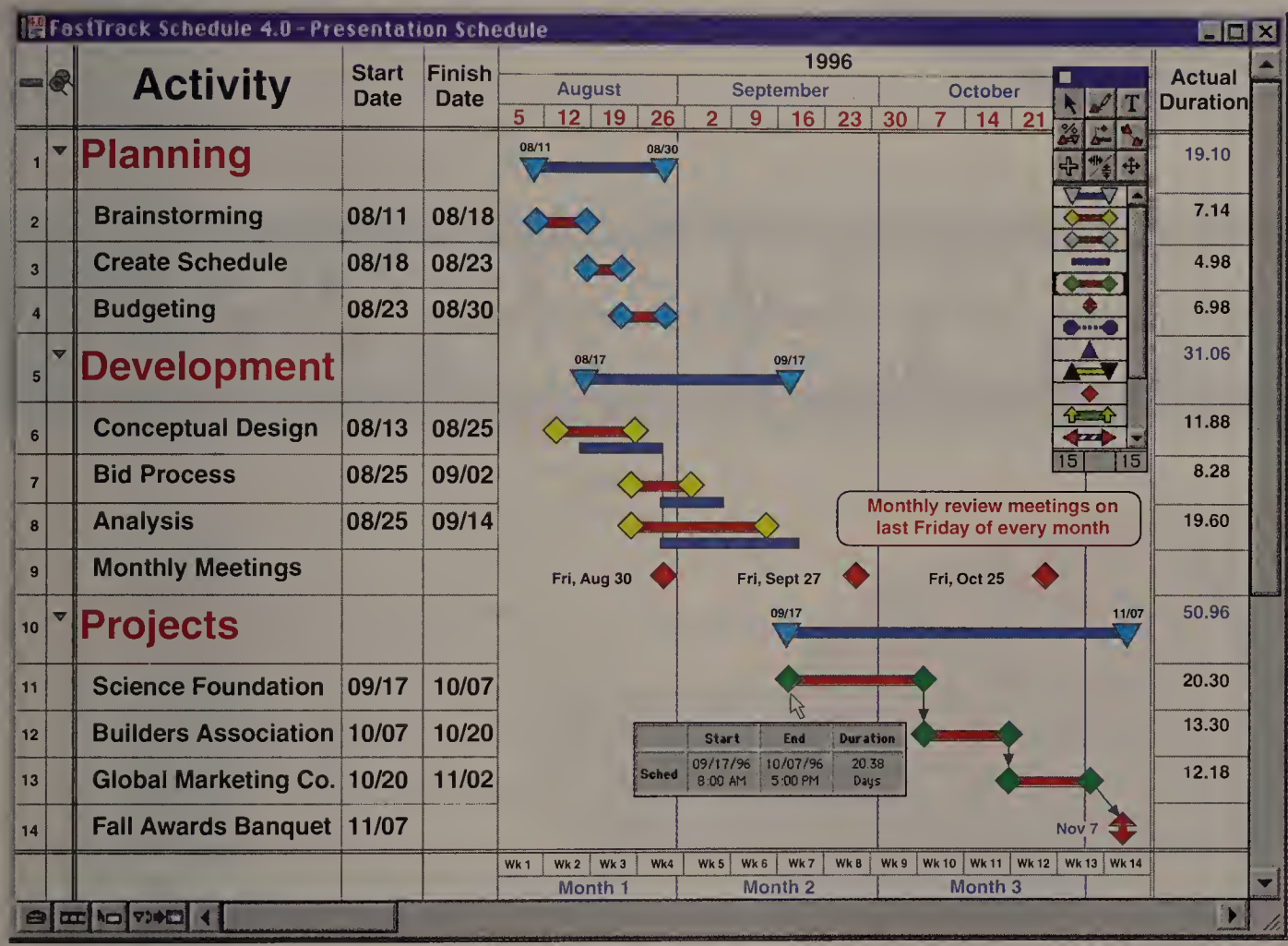

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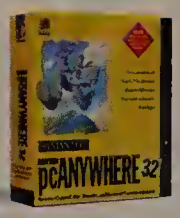

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In the Fast Lane: Motorola Lifestyle 28.8 and Zoom V.34C

New Pair of Best Buys: *Zoom Telephonics' V.34C and Motorola's ISG Lifestyle 28.8 modems excel at the basics—great performance at affordable prices.*

If men are from Mars and women from Venus, then PC Card modem companies must be from Pluto. Though Windows 95 is now a household name, virtually none of the PC Card modem manuals even mentions it—a problem when a PC Card modem isn't completely Plug and Play. We spent several hours on the phone with technical support installing three new PC Cards units that, according to the promise of Plug and Play, should have taken about 10 seconds each. We discovered that the combination LAN adapter/modem cards, such as the 3Com EtherLink III and Motorola Marquis cards (which were tested this month but did not make the chart), can be especially thorny to install because multifunction PC Card devices can't work directly with Windows 95's Plug and Play software. Even simple PC Card modems can leave a user hanging. For example, not only did Zoom's new V.34C card come without the latest driver, the manual didn't say what driver to use with it. But while the V.34C Model 520 card was difficult to install, that's our only criticism of it. This $199 Best Buy is the least expensive and best overall performer on the PC Card chart, and it offers Flash ROM upgradability.

Looking at external modems, we've seen a couple of exciting additions to our charts. Motorola's ISG Lifestyle 28.8 is our new Best Buy. It's a good-looking unit with a friendly $200 price, and it blew all the other modems away in performance. The U.S. Robotics Sportster didn't give up its title without a fight. We retested it this month with brand-new firmware that gave it enough extra juice to put it on the heels of the Lifestyle. Zypcom's Z34-SEW, though fast, was too pricey to make the chart, while Infotel's 14.4 modem was too poor a performer.

TOP 10 MODEMS

	Last ranking	First reviewed	Street price external/internal (ISA)	Overall rating	Throughput rating	Connect rating	Features, ease-of-use rating	Reader service number	Comments
DESKTOP MODEMS									
1 **Motorola ISG Lifestyle 28.8** 800/566-3266	–	current	$200 / $175	89	85	97	69	631	Connects at 28.8 kbps nearly all the time. The price is nice and includes toll-free support.
2 **U.S. Robotics Sportster V.34 Faxmodem** 800/342-5877	–	current	$219 / $199	88	83	90	78	632	New firmware improves performance. Came in a close second to the Best Buy.
3 **MaxTech XM288E** 800/936-7629	2	Nov 95	$174 / $145	85	81	73	76	633	Fabulous price for a solid unit; VoiceView allows voice-data switching on one phone line.
4 **Microcom DeskPorte Fast V.34** 800/822-8224	3	Nov 95	$391 / –	84	75	90	88	634	Expensive, but very easy to use. Has plain-language display.
5 **Practical Peripherals PC288LCD V.34** 770/840-9966	4	Nov 95	$359 / –	84	85	82	81	635	Pricey but fast, and one of the easiest to use of the modems we've tested.
PC CARD MODEMS									
1 **Zoom Telephonics V.34C Model 520** 800/631-3116	–	current	$199	88	74	90	77	636	Installation requires a support call, but it's the best on the chart for price and performance.
2 **Microcom TravelCard 28.8P** 800/822-8224	2	Feb 96	$274	85	77	80	78	637	$25 price drop helps keep this excellent performer in the runner-up spot for a second month.
3 **Megahertz XJ2288** 800/527-8677	1	Feb 96	$309	85	76	69	85	638	Comes with excellent documentation, pop-out phone jack. Great for technophobes.
4 **Hayes Optima 288 V.34+Fax for PCMCIA with EZjack** 404/840-9200	3	Feb 96	$299	82	79	72	76	639	Pricey, but a great performer and has a pop-out phone jack.
5 **U.S. Robotics Sportster V.34 Data/Fax PCMCIA** 800/342-5877	4	Feb 96	$300	80	75	77	71	640	Not outstanding in any single area, but good all-around. Only PC Card with status lights.

BEST BUY

Methodology We tested each modem using a pair of identical units, one at each end of a simulated public-service telephone network from Telecom Analysis Systems. We tested throughput and connect rates using a variety of file types and line conditions outlined in the Telecommunications Industry Association's TSB-37A and 38 specifications. We used vendor-supplied initialization strings. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 904.

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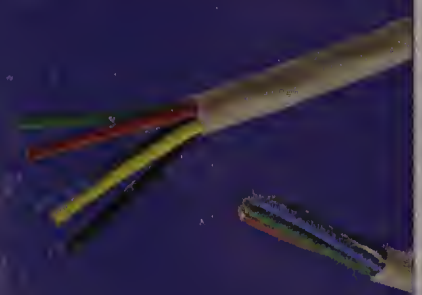
Distribution Amplifiers, like the P/2 DA 6 LC, capable of connecting one PC or MAC to multiple monitors or LCD panels.

Scan converters like the Emotia Jr. and Super Emotia (shown above) which convert PC and MAC video to TV signals for recording on videotape.



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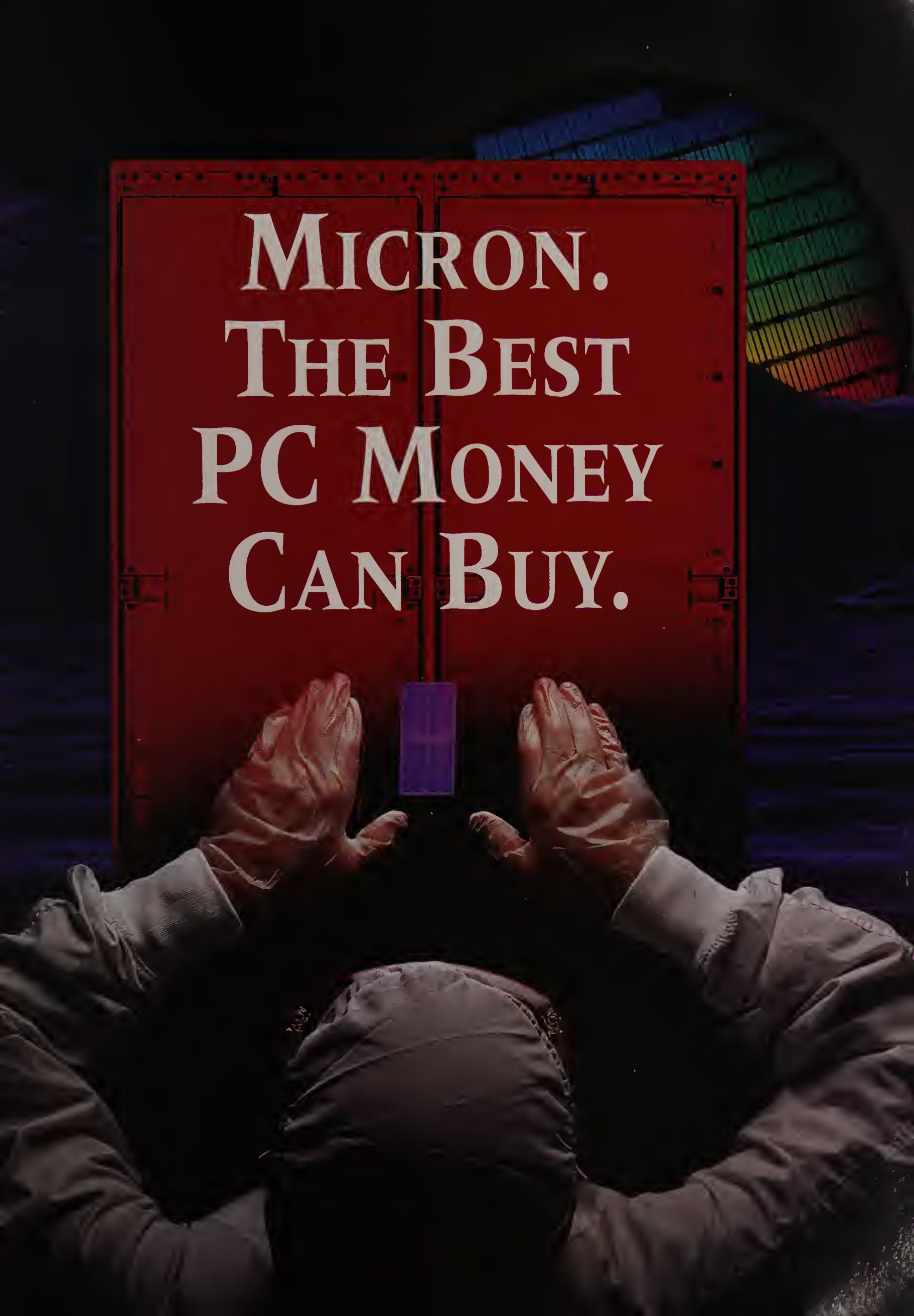
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PC MAGAZINE BEST OF 1995

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- *Tool-free* mini-tower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 CD
- 5-year/3-year Micron Power℠ warranty*

A • 8MB EDO RAM • 850MB EIDE hard drive
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• Microsoft Works 95 CD
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B • 16MB EDO RAM • 1.2GB EIDE hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
• Microsoft Office Pro 95 & Bookshelf 95 CDs
$2,699 Business lease $96/month

C • 32MB EDO RAM • 1.6GB EIDE hard drive
• 17" Micron 17FGx, .26dp (15.8" display)
• Microsoft Office Pro 95 & Bookshelf 95 CDs
$3,599 Business lease $123/month

- With 166MHz Pentium processor.....add $200

PC MAGAZINE EDITORS' CHOICE
May 30, 1995
P120 MILLENNIA

MVP 1995 WINNER PCComputing
December, 1995
P133 MILLENNIA

MILLENNIA PLUS P166

- Intel 166MHz Pentium processor
- 256K pipelined burst cache, flash BIOS
- PCI 32-bit Ultra SCSI Fast-20 controller
- 6X SCSI-2 CD-ROM drive, 3.5" floppy drive
- SoundBlaster 16 stereo sound & speakers
- PCI 64-bit video, MPEG, 2MB EDO
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PC MAGAZINE BEST OF 1995
January 9 1996 MILLENNIA

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- PCI 64-bit video, MPEG, 2MB EDO
- *Tool-free* mini-tower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 CD
- 5-year/3-year Micron Power℠ warranty*

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- Microsoft Works 95 CD

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B • 16MB EDO RAM • 1.2GB EIDE hard drive
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- Microsoft Office Pro 95 & Bookshelf 95 CDs

$2,699 Business lease $96/month

C • 32MB EDO RAM • 1.6GB EIDE hard drive
- 17" Micron 17FGx, .26dp (15.8" display)
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- With 166MHz Pentium processor.....add $200

PC MAGAZINE EDITORS' CHOICE
May 30, 1995
P120 MILLENNIA

MVP 1995 WINNER PC Computing
December, 1995
P133 MILLENNIA

MILLENNIA PLUS P166

- Intel 166MHz Pentium processor
- 256K pipelined burst cache, flash BIOS
- PCI 32-bit Ultra SCSI Fast-20 controller
- 6X SCSI-2 CD-ROM drive, 3.5" floppy drive
- SoundBlaster 16 stereo sound & speakers
- PCI 64-bit video, MPEG, 2MB EDO
- *Tool-free* mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- 5-year/3-year Micron Power℠ warranty*

A • 16MB EDO RAM • 1GB Fast SCSI-2 hard drive
- 15" Micron 15FGx, .28dp (13.7" display)

$3,299 Business lease $112/month

B • 32MB EDO RAM • 2GB Fast SCSI-2 hard drive
- 15" Micron 15FGx, .28dp (13.7" display)

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C • 64MB EDO RAM • 4GB Fast SCSI-2 hard drive
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intel inside pentium PROCESSOR

POWERSTATION P100

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- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 CD
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- 15" Micron 15FGx, .28dp (13.7" display)
- Microsoft Office Pro 95 & Bookshelf 95 CDs

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- With 75MHz Pentium processor.....subtract $100

POWERSTATION LX P75

- Intel 75MHz Pentium processor
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- 3.5" floppy drive, flash BIOS
- PCI 64-bit graphics accelerator (1MB)
- 15" Micron 15FGx, .28dp (13.7" display)
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- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95
- Microsoft Works 95
- 5-year/3-year Micron Power℠ warranty*

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- With 100MHz Pentium processor.....add $100

PowerServer SMP P133

- Intel 133MHz Pentium® processor
- Dual Pentium SMP ZIF sockets
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- PCI 32-bit Ultra SCSI Fast-20 controller
- 4X SCSI-2 CD-ROM drive, 3.5" floppy drive
- PCI 64-bit video, MPEG, 2MB EDO
- Full-size tower with 10 drive bays
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 CD
- 5-year/3-year Micron Power℠ warranty*

A • 16MB RAM • 1GB SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)

$3,199 Business lease $109/month

B • 32MB RAM • 2GB SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)

$4,099 Business lease $138/month

- With second 133MHz Pentium processor.....add $499
- With Windows NT Workstation 3.51 CD.....add $249

PowerServer SMP P266

- Dual 133MHz Pentium processors
- 512K write-back cache, flash BIOS
- Slots: 5 EISA, 2 PCI, 1 EISA/PCI
- PCI 32-bit Ultra SCSI Fast-20 controller
- 6X SCSI-2 CD-ROM drive, 3.5" floppy drive
- PCI 64-bit video, MPEG, 2MB EDO
- Full-size tower with 10 drive bays
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows NT Workstation 3.51 CD
- 5-year/3-year Micron Power℠ warranty*

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A • 32MB RAM • 2GB SCSI-2 hard drive
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Computer Shopper Best Buy of 1995

P133 PowerServer SMP

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PC MAGAZINE EDITORS' CHOICE
May 16, 1995
P90 HOME MPC

PC WORLD WORLD CLASS 1995
July 1995
P90 HOME MPC

HOME MPC PRO P150

- Intel 150MHz Pentium processor
- 256K pipelined burst cache, flash BIOS
- 16MB EDO RAM • 1.2GB EIDE hard drive
- 6X EIDE CD-ROM drive, 3.5" floppy drive
- SoundBlaster 16 stereo sound & speakers
- 28.8 fax/modem, speakerphone, voice mail
- PCI 64-bit video, MPEG, 2MB EDO
- 17" Micron 17FGx, .26dp (15.8" display)
- *Tool-free* mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- Microsoft Scenes: Sports Extremes; Microsoft Bob CD; Microsoft Encarta 96 CD; Quicken Deluxe Edition CD; Microsoft Dangerous Creatures CD; Microsoft Golf Multimedia CD; Trial subscriptions for Compuserve, Prodigy and America On-Line.
- 5-year/3-year Micron Power℠ warranty*

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- With 166MHz Pentium processor.....add $200

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MICRON ELECTRONICS, INC.

The Right Way to Use OLE

Tips for dragging, dropping, linking, embedding, and making today's object-oriented software work for you.

By Rob Krumm

The computing world has suddenly gone object-crazy. Your desktop is an object. Your programs are objects. Your data files are objects, quite possibly made up of other, smaller objects. Your applications use something called Object Linking and Embedding. When you drag and drop, you are moving objects. Modern operating systems like Windows 95 and OS/2 Warp are like a whole bunch of objects bundled together.

Normally, you wouldn't care about how something is built. After all, you don't need to know how a chair is made to sit in it. But despite all the ease-of-use claims by Microsoft and others, you *do* need to know something about how today's software is constructed if you expect to use it effectively. In that spirit we offer the following advice, tips, and strategies on how to get object technologies like OLE to work for you. When should you use linking? When should you embed? When should you just say no to both? And how can you keep OLE objects from creating monstrously bloated files?

First a bit of background: Just about anything in your computer—a program, a data file, even a network connection—can be an object, and objects can be built out of other objects. One object might be a range of cells dragged and dropped from a worksheet into a word processing document or presentation slide. Another could be a spelling checker that runs in any application. In theory, a program built to handle objects can work with any object thrown at it, with minimal knowledge about

JOHN BLECK

what that object does and how it does it.

Of course, nothing comes for free. In Office 95—the suite Microsoft is touting as a model for object-enabled applications—the programs are bigger and slower than their previous versions. This is partly because creating all those objects requires layers of code that wouldn't otherwise be there.

Secrets of OLE

You'll come face to face with object technology most directly when you use Object Linking and Embedding, a Microsoft-owned, Windows-based standard that allows you to display and use data from one application in another. Because a program doesn't need to know what a particular object does in order to use it, OLE works even if the programs involved were created by rival companies that don't even want to admit the others exist.

For instance, OLE allows you to put a drawing inside a worksheet, a video clip inside a word processing document, or a drawing or video clip inside a worksheet range inside a word processing document. OLE gives the *container* program—the program you put stuff into—a picture of the object to display, and it tells the container what source program—the one that created the object—should be called up when you double-click on the object to edit it. As long as both programs support OLE, one doesn't need to know anything else about the other. Containers and sources are also often called clients and servers.

As the name implies, you can use OLE to link or embed objects. When you *link*, say, a Paint picture to a Word Pro document, you give Word Pro the name of a .bmp file, and the word processor displays the contents of that file. Every so often, Word Pro will check the linked .bmp file and, if you have edited that file, update the image it displays.

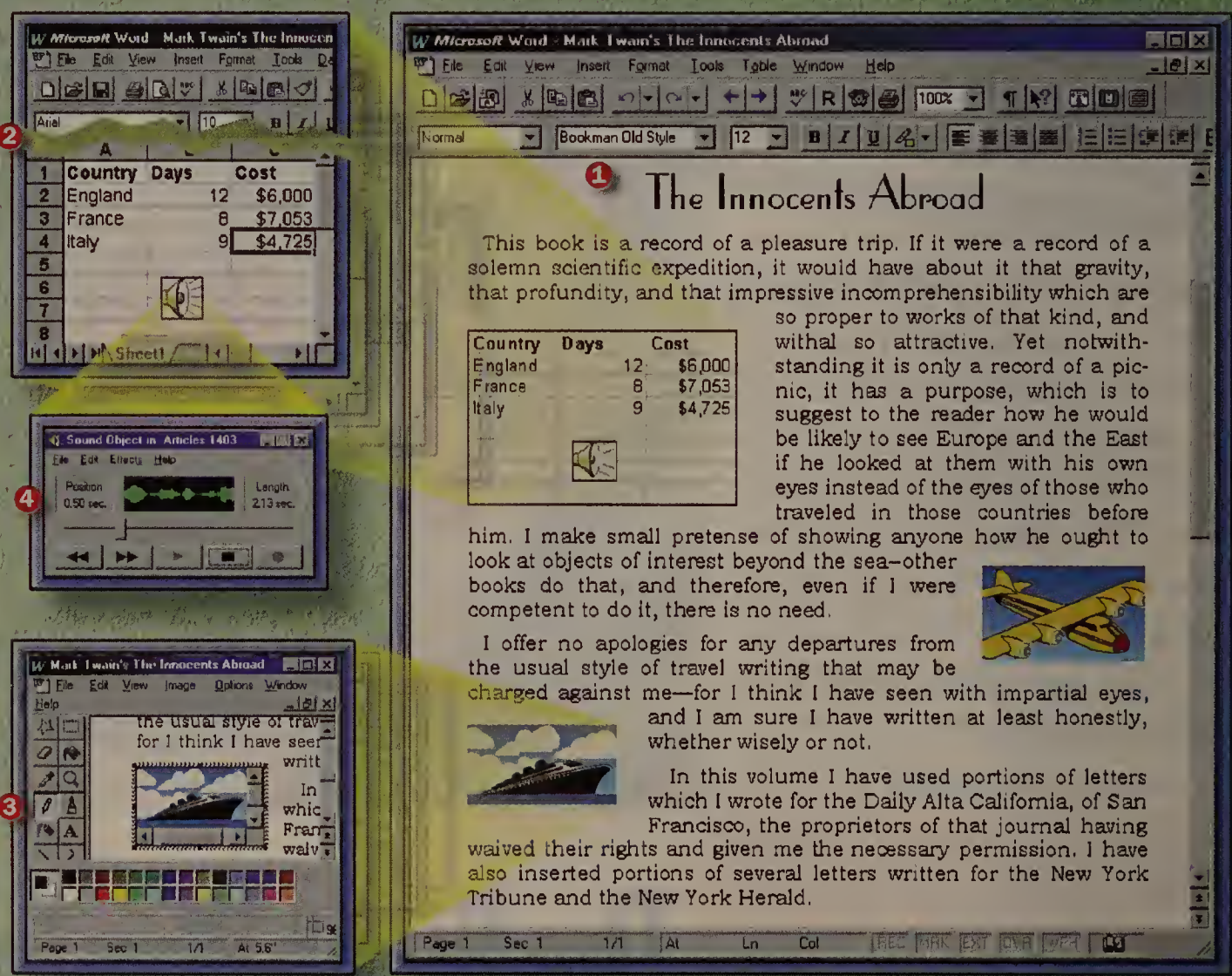
When you *embed* a Paint picture in a Word Pro document, you create something like a .bmp file inside your word-processing document. It's not really a file, because your operating system doesn't know it's there, but Word Pro can display the picture and bring up Paint to edit it.

Which is better? If you're worried about your master document getting too large, linking will help keep its size a bit more under control. And you can link the same object to several documents—for instance, you could put a worksheet with prices into any number of sales proposals.

On the other hand, if you move or delete any of the files in that link, you lose the link. You'll still be able to see the linked objects in your container file, but if you double-click on one to edit it, all you'll get is an

One File, Many Kinds of Data

Thanks to OLE, a single file can contain data created by several applications and let you edit each type of data in the appropriate program.



1 The document on the right was created in Word for Windows, yet it contains an Excel worksheet and two bitmapped graphics. And the worksheet contains a sound recording.

2 An Excel object in a Word document looks like a table, but when you double-click it, it develops Excel-like borders, and Excel's icon bar replaces Word's.

3 A Paint object works like an Excel object.

4 The sound object looks like an icon, but it comes alive when you select it.

INFOGRAPHICS: NICK FAIN

error message. With embedding, everything is in one file, so the file can be moved or copied without losing data.

Linking and embedding have different ways of slowing you down. If you've got a CorelDraw picture linked to a PageMaker document, PageMaker will occasionally have to load CorelDraw—not always a fast process—to see if the link needs updating. But if the picture is embedded in the document, you can't edit it without loading PageMaker first—another process that can take time.

Linking a file to another document. The exact way to create links may vary with different programs, but it's generally like this: From inside the container application, select *Insert•Object* (if there's no Insert menu, try the Edit menu), click the *Create from File* tab, select the file you wish to link to your current one, check the *Link to File* option, and click *OK*.

Embedding an existing file in a document. Follow the same procedure as above, only make sure that *Link to File* is *not* checked.

Creating an embedded object from scratch. Select *Insert•Object* or your container application's equivalent command, click the *Create New* tab, select your source application's object type, and click *OK*.

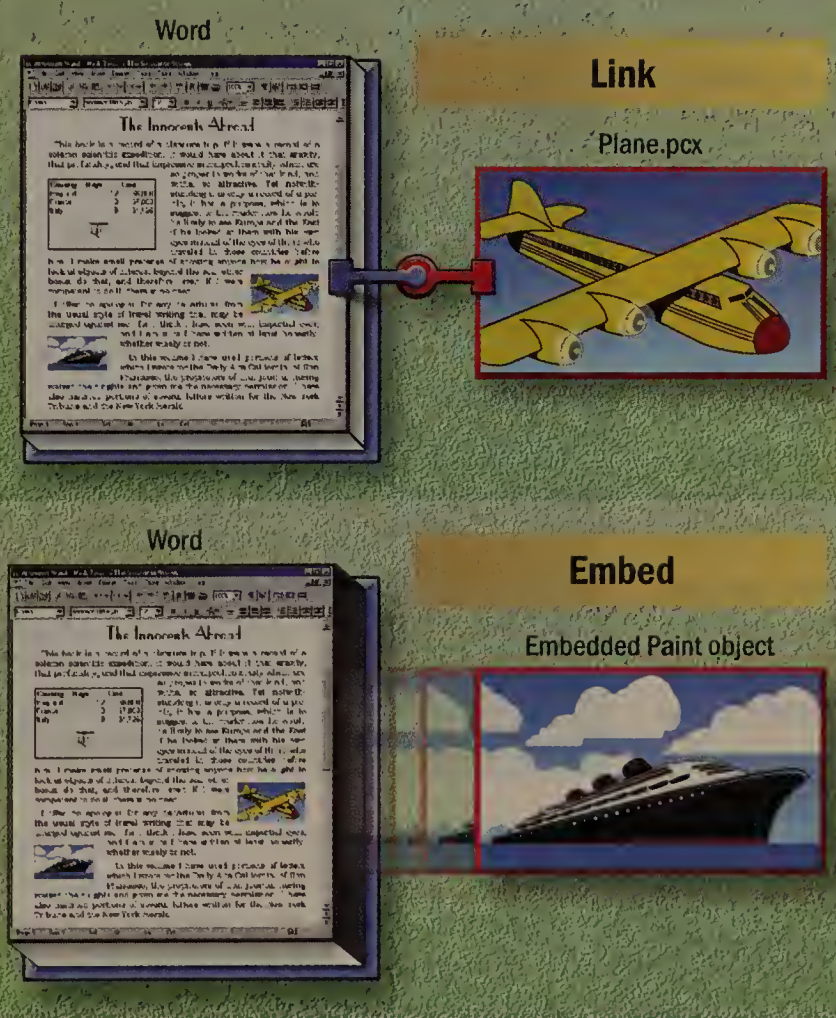
Turning an embedded object into a link. Say you want to turn an Excel range, currently embedded in a Word for Windows file, into a linked file: Double-click the object to bring up Excel, highlight the entire worksheet, and select *Edit•Copy*. You no longer need Excel running inside of WinWord, so click somewhere in your word processing text to get out of the spreadsheet and back into the word processor.

But you *will* need Excel running by itself, so launch it from Program Manager or the Start menu. Inside Excel, use *Edit•Paste* to insert your worksheet into a new file. Save the file and exit.

Back in WinWord, click the old object and press **<Delete>**. Then link your newly created file to the same location, as described in the tip "Linking a file to another document."

Link Versus Embed

Linked objects are stored outside the document, helping to keep the document's size under control. Embedded objects are stored inside the document, so that the document can be moved without losing data.



Turning a linked file into an embedded object. In the container application's Links dialog box (reached via *Edit•Links* in most programs), you'll find a button with the promising name *Break Link*. Don't touch it! If you do, OLE will convert the link into a mere picture of what was there before, not into an embedded object. This may be fine if the link was to a Paint file, but it's not very helpful with a database report. The trick is to reinsert the object without linking, then delete the link.

To do this, bring up the Link dialog box and note the name and location of the linked file; you may have to write this down. Click *Cancel*. Then click the object and press **<Delete>** to erase the link (the file itself will be unharmed).

Next, bring up your Object dialog box (probably with *Insert•Object*), click the *Create from File* tab, and select the file the object was linked to. Make sure *Linked to File* is *not* checked, and press *OK*.

Bloated and Slow

There are a lot of positive things you can say about OLE, but *fast* and *sleek* aren't two of them. The fact is, once you add links and embedded objects to a file, it's going to get very large and very slow.

For instance, what if you want to insert a picture, in a Paint .bmp file format, into a WinWord document? If you use an OLE link, the resulting .doc file will be about the size of the original WinWord file plus two copies of the .bmp file. If you embed rather than link, make that a full three copies of the .bmp file.

Besides making files large, OLE can slow you down to a crawl—especially if your PC's speed is modest to begin with. If you've got a Paradox report embedded in a WinWord document, WinWord will have to load and unload Paradox every time you double-click that object—more often than that if it's linked. Here are some tips for keeping file size down and performance up.

Don't use OLE unnecessarily. If your container app can read files created in your source app, you may be able to save disk space by avoiding OLE completely. For instance, WinWord's *Insert•Picture* command inserts a bit map directly into your .doc file without going through OLE. If you use this option in the .bmp-inside-WinWord example above, you'll get a file only slightly larger than the two originals combined. You won't, however, be able to easily edit this bit map.

Keep the source app running. Ever find yourself waiting as the same source application is loaded over and over again? For instance, if your PageMaker file has several CorelDraw images, OLE will load CorelDraw when you want to edit the first object, exit it when you're done, then load CorelDraw again when it's time to edit the second object. You can speed things up by loading CorelDraw from Program Manager or the Start menu. That way, it'll be there when you need it. And be careful not to exit Corel when you're done editing a drawing.

Use small source apps. Avoid objects from large programs like Excel or CorelDraw whenever possible. Small programs like Paint update, load, run, and close much faster. Some of the fastest sources are programs that are designed to function specifically, or even exclusively, as object sources. These include the WordArt applet that comes with Microsoft Office and AlphaBlox's OfficeBlox, a collection of applets that include a Post-it–style notation program and a calculator. Such programs are small, fast, and generally quite capable of doing one thing very well.

Avoid automatic updates. By default, OLE updates links automatically each time you open a document, loading and unloading every app and file involved. In fact, if a file contains two links to the same application—say, 1-2-3 for Windows—the spreadsheet program will be loaded and unloaded twice before you can get to work. To avoid extra long loading times, set your links for manual, rather than automatic, updating: Go to the Links dialog box, which you can probably get to by selecting *Edit•Links*. For each link, click the *Manual* radio button on the Update line. One catch: To update these links, you'll have to return to this dialog box and click the *Update Now* button.

Keep your Windows 3.x resources down. As you load more and more programs into older, 16-bit versions of Windows, you increase the chances of crashing your system, even if you dutifully exit the programs when you're through with them. This is because applications tend to grab Windows resources and don't always give them back. Since OLE encourages you to enter and reenter applications, it increases the likelihood of disaster.

If, in the course of a day's work, you find you've been doing a lot of loading and unloading of applications to edit objects, exit and reenter Windows every so often for a fresh start. You shouldn't have this problem with Windows 95, which is much better at handling resources.

Beyond OLE 2.0: The Future of Object Technology

There's a lot that OLE 2.0 can't do. It can't give you objects in any shape other than a rectangle. It doesn't tell the operating system about the objects in a file. And it won't let you distribute objects across a local area network—to say nothing of the Internet. Here are some new technologies that could help fulfill the promise of OLE.

Java

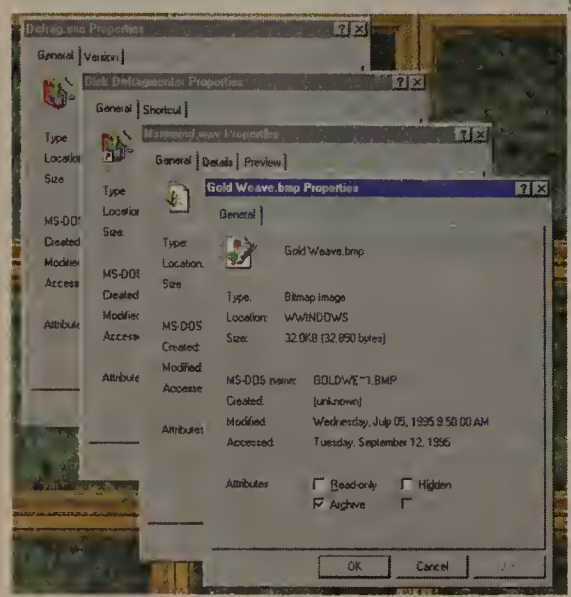
Thanks to this object-oriented programming language developed by Sun Microsystems, it's now becoming possible to run programs over the World Wide Web on any kind of computer. All you need is a Web browser that can run Java programs, such as Netscape Navigator 2.0. A Java program can sit in a Web page like an OLE object in its container, a self-contained whole within another whole.

Java programs currently include animations, games, and ticker tapes, but serious applications may come too. Sun believes that Java will eventually be used for companywide as well as worldwide applications. As I write this, Java-based applications and browsers supporting Java are starting to appear.

OpenDoc

A consortium led by three major Microsoft competitors—IBM, Apple, and Novell—is creating a rival to OLE. Like OLE, OpenDoc is an object standard that will allow you to link and embed data from one application into another. According to its designers, OpenDoc is compatible with OLE, allowing you to place an OpenDoc source inside an OLE container and vice versa.

Unlike OLE, OpenDoc will run under OS/2 Warp and UNIX, in addition to Windows and the Mac. While all OLE objects are rectangles,



PROPERTY DIALOG BOXES vary with file type, but they all have the General tab in common.

The Drag-and-Drop Connection

Did you know that you can drag data from one application to another? It's as easy as it sounds: Select a range in Excel, drag it into WinWord, and you'll have an embedded spreadsheet object in WinWord and an empty worksheet in Excel. To copy the range in the spreadsheet instead of moving it elsewhere, use **<Ctrl>**-drag.

Well, actually, this doesn't always work. Both applications must support OLE 2.0, which is common among Windows 3.*x* applications and ubiquitous for Windows 95 apps. Even then, it's not perfect. If you drag text from WinWord to Excel, the text will

go directly into the cell you drop it in, without benefit of OLE. That is, unless there's already an OLE object in your worksheet. Then the drop will create another object.

Windows 95 lets you drag and drop a piece of a file directly onto the desktop—a handy place for something you may need later. When you do this, the data becomes a *scrap*, a free-floating OLE object. When you drag the scrap into an application, it becomes either an OLE object or straight data, depending on the file formats involved.

course, there have to be some differences—you don't want a bit-mapped graphic to act like a spelling checker. But the more they have in common, the easier they are to use.

Consider, for instance, the click of the right mouse button. In many programs, this pops up a menu of options relating to—and affected by—the type of object clicked.

For example, in Windows 95, right-clicking a folder window or the desktop gives you options to arrange icons and create new files, plus an option called *Properties*. Right-

OpenDoc objects can also be circles, triangles, or irregular shapes. According to IBM, moving an OpenDoc linked file won't break the link. And systems administrators will be able to distribute OpenDoc objects across networks, creating, for instance, forms that automatically route themselves via e-mail to PCs and Macs. OpenDoc applications for the Mac and OS/2 may be available by the time you read this, with Windows apps appearing before the end of the year.

Cairo

Microsoft isn't sitting still while IBM and Apple play catch-up. A major new version of Windows NT, code-named Cairo, is scheduled to begin beta testing this year and promises to handle objects with aplomb. In fact, the whole file system will be object-aware.

What exactly does that mean? For one thing, file management tools may be able to see the embedded objects in a file, making it possible to edit, say, an embedded spreadsheet range without first loading the container app.

And Cairo will be able to access extended file properties that are specific to the file type, such as the comments in a WinWord file, far faster than Windows 95 can even dream of doing. Why? Because it will store these properties in the directory structure rather than in the files themselves, as does Windows 95.

Through a technology called *Distributed OLE* (or *Network OLE*), Microsoft plans to give Cairo the sort of information-sharing capabilities promised in OpenDoc, allowing data to flow from anywhere to anywhere on a multiplatform network. With Distributed OLE, desktops, servers, mainframes, and legacy systems will—at least in theory—have a means of seamlessly exchanging information and providing services to one another.

Since scraps are OLE objects, any application that supports OLE 2.0 can create and retrieve scraps—even 16-bit Windows 3.1 applications that never heard of Windows 95. You can also put scraps in folders, although the desktop is the most convenient place for them. When you drag data to the desktop to create a scrap, OLE copies—rather than moves—the data.

The Right-Click Stuff

OLE works because applications handle it in a consistent way. Ideally, all objects should act alike, making themselves easier for programs—and people—to use. Of

click an empty space on the Taskbar, and you'll get options for arranging the windows on the desktop, plus *Properties* again. Right-click a file, and you'll get options to open, copy, delete, and move it, plus our old friend *Properties*.

See the pattern? Simply put, all objects have *properties*, with the type of object defining what those properties are. But regardless of object, the Properties option is always in the same place. The desktop's properties help you set the wallpaper and screen colors, the Taskbar's properties control whether the bar disappears, and a printer's properties select the paper source.

All files share certain properties, such as the file attributes inherited from DOS (read-only, hidden, and so on). But different types of files can carry particular properties of their own, allowing you, for instance, to see who created a .wav file, to add comments to a WinWord file, and to find out what company wrote a .dll. Even Windows 95's Shortcuts, which are also a kind of file, have unique properties, defining what file they point to and how they should be opened.

Not that Windows 95's right-click menus and property dialog boxes are as consistent as they should be. But right-click a program file, and you'll get one set of options. Right-click the running program's icon on the Taskbar, and you'll get another set—one without a Properties option. Right-click a Shortcut to that program on the desktop, and you'll get the exact same options you'd get for the program itself, although they now refer to the Shortcut. Right-click a Shortcut on the Start menu, and you won't get a thing. Think of how much more convenient it would be if you could right-click a Shortcut on the Start menu and get access to the Shortcut's properties. Or better yet, the Shortcut's *and* the program's!

Maybe in Windows 96. In the meantime, we need to deal with objects as they work today. That means learning how to make OLE behave—not a bad objective in a universe obsessed with objects.

Rob Krumm is the author of Access Programming for Dummies *(IDG Books, 1994, 617/794-4000). Krumm can be reached at 76137.1410@compuserve.com.*

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War of the Words

Lotus Word Pro Vs. Microsoft Word

Word Pro 96 is the workgroup king, but slow performance takes it out of play.

Thanks to Lotus, there's finally some competition in the Windows 95 word processing market. In fact, with WordPerfect's future in doubt, Lotus Word Pro 96 for Windows 95 may be Microsoft Word 95's only real competition for quite some time. But Word Pro is playing catch-up, having arrived in its Windows 95 flavor several months after Microsoft Word 95 appeared. Whereas the move from Word 6 to Word 95 is well-advised (see December's *Microsoft Office 95: Who Needs It?*), Ami Pro users, or users of Word Pro 96 for Windows 3.1, may want to pass on Word Pro 96 for Windows 95.

The new 32-bit Word Pro 96 is nearly identical to the Windows 3.1 version that Lotus shipped last September except that it takes advantage of common dialog boxes, long file names, and other Windows 95 enhancements. Its many powerful new features, including links to Lotus Notes, unsurpassed workgroup innovations, and excellent handling of long, complex documents, make it worth recommending. In addition, its support of OLE 2.0 gives Word Pro 96 a big role in SmartSuite 96, which wasn't shipping at the time of this writing but will be reviewed in an upcoming issue (see January's *Top of the News* for a preview).

But the news is not all good. Ami Pro users will miss functions they've come to expect, like the ability to wrap a single column of text around a frame or assign macros to hot keys. Most important, a look at the final code of Word Pro 96 for Windows 95 reveals that it's slow—extremely slow. From loading files to importing graphics, Word Pro 96 was much slower than Microsoft Word 95 at just about every task in our tests, regardless of processor or amount of memory. In short, if you use Microsoft Word, there's little reason to move to Word Pro 96. And if you use Ami Pro, there's little reason to upgrade—unless your heart is set on a Windows 95 word processor. However, if you crave superior workgroup tools or work with Lotus Notes, you might consider trying Word Pro 96. And if you've already moved to Word Pro 96 for Windows 3.1 and are happy with it, Word Pro 96 for Windows 95's scattered performance gains over the 3.1 version, along with its Windows 95 features, may be enough to lure you to upgrade. Just make sure you have some powerful hardware.

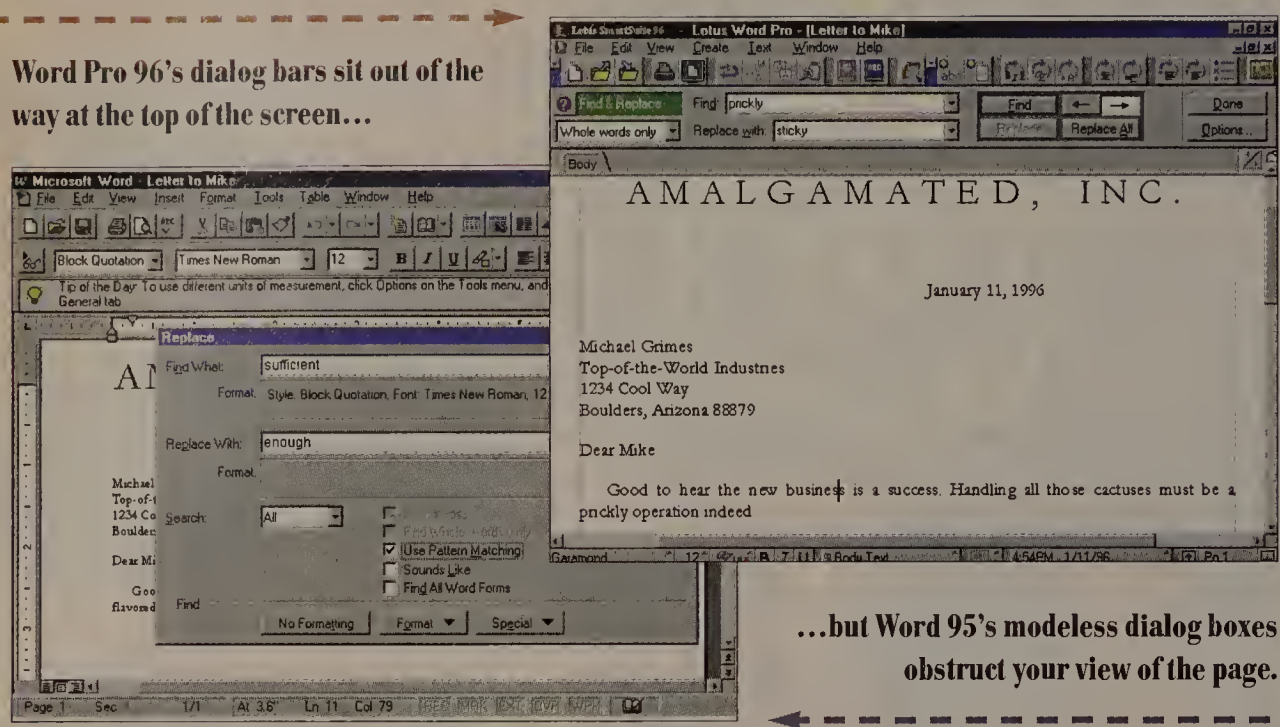
So Much Promise

Word Pro 96's sluggish performance is unfortunate because the program actually offers some excellent enhancements over both the old Ami Pro and Microsoft Word 95. Lotus

By George Campbell

JAMES STEINBERG

Word Pro 96's dialog bars sit out of the way at the top of the screen...



...but Word 95's modeless dialog boxes obstruct your view of the page.

didn't just upgrade Ami Pro when it introduced the new Word Pro 96 line (an OS/2 version is waiting in the wings), it wrote a whole new program from the ground up. Starting with the menus, which are completely rearranged, the application looks and feels markedly different. For the most part, the new interface is excellent, even if it means that Ami Pro users are in for some retraining. You won't see Ami Pro's old Style or Page menus. Instead, you right-click in a document and use the convenient pop-up menu to access formatting tools. Various functions from the old Tools menu are now scattered among several other menus.

Naturally, the Windows 95 version of Word Pro 96 supports long file names (a reason in itself to consider upgrading), so you can name a file 'Sales Letter to Amalgamated' rather than sletamal.lwp. It also uses Windows 95 common dialog boxes for things like opening and saving documents, and it supports right-mouse-button access to a document's properties.

Word Pro 96's SmartMaster templates replace Ami Pro's Style Sheets for creating documents such as memos, faxes, and newsletters. SmartMasters are similar to Microsoft Word's excellent Document Templates, but they include "click here" areas that prompt you to insert text, graphics, OLE objects, and more. About all that's missing from Word Pro 96's SmartMasters is something akin to Microsoft Word 95's Document Wizard, which walks you through the whole process of creating a document.

Like Microsoft Word 95, Word Pro 96 offers a natural-language help system that augments its standard help tools. In theory, you simply type a question like "How do I add footnotes?" and Ask the Expert attempts to locate the answer. The verdict is not yet in on the usefulness of natural-language tools. Your questions must still use terms found in the help system's index. For example, if you forget what footnotes are and type "How do I make notes at the bottom of a page?" you may be offered a long series of unrelated topics. But this implementation marks a good start toward better user assistance.

Formidable Formatting

Once you're in a document, Word Pro 96 features exceptional formatting tools, although perhaps not as stellar as Microsoft Word 95's. For example, Word Pro 96 has no

Word Pro Is for Workgroups

MANUELLO PAGANELLI

Despite Word Pro 96's slow performance, users of Lotus Notes may find it fits nicely into their workplace. "We'd been Microsoft users for a long time," says Bob Patterson, founding principal of Asset Strategy Consultants in Alexandria, Virginia. "In fact, we'd billed most of our clients using Microsoft Word." Then a couple of years ago, the firm began using Lotus Notes to communicate between its three offices as well as with several clients. "As we got into document preparation, we found we were tracking a lot of revisions, so [last year] we began to use Word Pro as a beta site," he says. "When the final release came out, we held our breath and went for it."

Patterson says he likes Word Pro 96's tight integration with Lotus Notes as well as its robust workgroup features. He also appreciates the program's tabbed interface for organizing tables and sections in the lengthy documents his firm produces. Now, he says, his company is considering getting its clients to work with Word Pro.

What about the program's performance? Patterson admits Word Pro 96 is slower than Microsoft Word 95 but says the speed hit is bearable because he uses a Pentium-90 with 16MB of RAM. He realizes Word Pro may bog down those users who have less powerful systems. But for now, with a new Notes server in place, Patterson says Word Pro is right for his firm. And he's got an eye on the future: "We're not at the Internet level yet," he says, "but we're working at it, and that makes Word Pro's Internet links intriguing."

In Head-to-Head Competition, Microsoft Word 95 Bests Lotus Word Pro 96

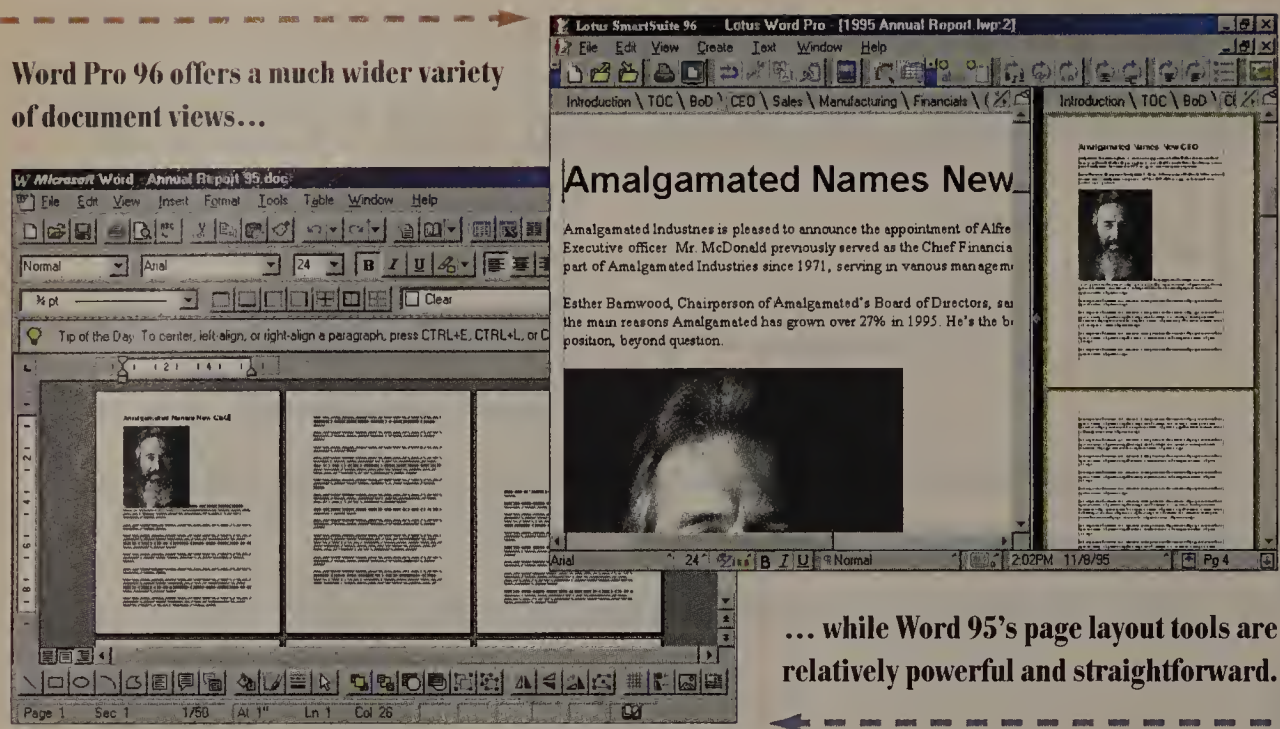
Editors' choice	Lotus Word Pro 96 for Windows 95	Microsoft Word 95	Comments
Windows 95 features		✓	Lack of multithreading slows some Word Pro operations, such as automatic saving.
Interface design	✓		Word Pro's unobstructive dialog bars and context-sensitive floating InfoBox excel.
Performance		✓	By any measure, Word Pro is painfully slow compared with Word 95 in all configurations.
Basic editing	✓	✓	After many years of evolution, both programs have basic editing down pat.
Formatting		✓	Word 95's superior automatic formatting stands out; Word Pro's is very slow.
Long-document features	✓		Word Pro's tabbed sections and divisions are a real plus for organizing complex documents.
Styles	✓	✓	Tomayto, tomahto—the programs implement styles differently, but both do it extremely well.
Templates		✓	Word 95 gets the nod for its helpful Document Wizards and excellent handling of forms.
Layout		✓	Ami Pro beats Word 95, but Word 95 beats Word Pro—an unfortunate step back for Lotus.
Frames		✓	Word Pro can't wrap text around both sides of frames in plain documents.
Graphics handling	✓	✓	Even though Word Pro lacks some of the old Ami Pro's graphics power, this contest is a draw.
Proofing		✓	Word Pro's spell-check-as-you-type falls behind on slow systems; Word 95's is superb.
Import and export	✓	✓	It's taken these programs a while, but both now handle a wide range of file formats well.
Mail merge		✓	Word 95's integrated address book is a big step toward easing a complex task.
Tables		✓	Word Pro lacks Word 95's one-stop automatic table formatting.
Drawing		✓	Word 95 draws directly on the page; Word Pro draws only in frames.
Charting	✓	✓	Both have excellent built-in charting tools to help flesh out business documents.
File management		✓	Word Pro offers no real file management tools as Ami Pro did.
User assistance		✓	Word 95's plentiful wizards are stronger than Word Pro's assistants; on-sceen help is a draw.
Workgroup features	✓		By far Word Pro's best feature; Team Review and links to Notes provide a huge boost.
OLE support	✓	✓	Both support Object Linking and Embedding 2.0 well as client and server.
Cross-platform compatibility	✓		Word Pro is essentially the same in Windows 3.x, Windows 95, and soon OS/2.

feature to rival Word 95's AutoFormat, which formats items like lists and headings as you type. It has a Check Format command that formats quotation marks and bulleted lists, removes extra spaces, and more, but it's slower than AutoFormat.

As in Ami Pro, you can access styles, colors, typefaces, and font sizes by clicking on the status line at the bottom of the screen. There's a cool new feature, too: If you want to see how various attributes affect your text without having to choose them repeatedly from menus, you can cycle through typefaces, font sizes, and so forth by clicking on the toolbar. For example, click the typeface cycle button once, and the text is Arial; click it again, and it's Baskerville. You can't cycle backward, however, so if you speed past the perfect typeface, you must either cycle around through the entire list of options again or specify your choice from a menu.

Perhaps Word Pro 96's best formatting feature is its floating InfoBox, accessible via the right mouse button. This small dialog box displays text or page properties in a series of tabbed sections—alignment, fonts, numbering, bullets, styles and so on. You can set formatting and see the changes reflected instantly in your document, rather than in a preview window as with many of

Word Pro 96 offers a much wider variety of document views...



... while Word 95's page layout tools are relatively powerful and straightforward.

Microsoft Word 95's formatting dialog boxes. InfoBox functions change depending on whether you're working in text, tables, or frames or setting page-layout options. If you use a high-resolution display, the InfoBox will be small enough to rest out of the way on the desktop.

Word Pro 96's new automatic spell-checking tools reflect a less-than-successful effort to keep up with Microsoft. When you misspell a word, a small button on the status bar lights up; click the button to replace the word, ignore it, and so forth. Another option highlights misspelled words as you type. Unfortunately, the highlighting often lags behind your typing. In the end, we dispensed with all this automation and used Word Pro's spelling checker bar, which sits below the SmartIcon bar. Find and Replace, Grammar Checking, Revision, and other Word Pro tools display in similar dialog bars. They're more convenient than the floating dialog boxes Word 95 uses, which remain on-screen and obscure your document.

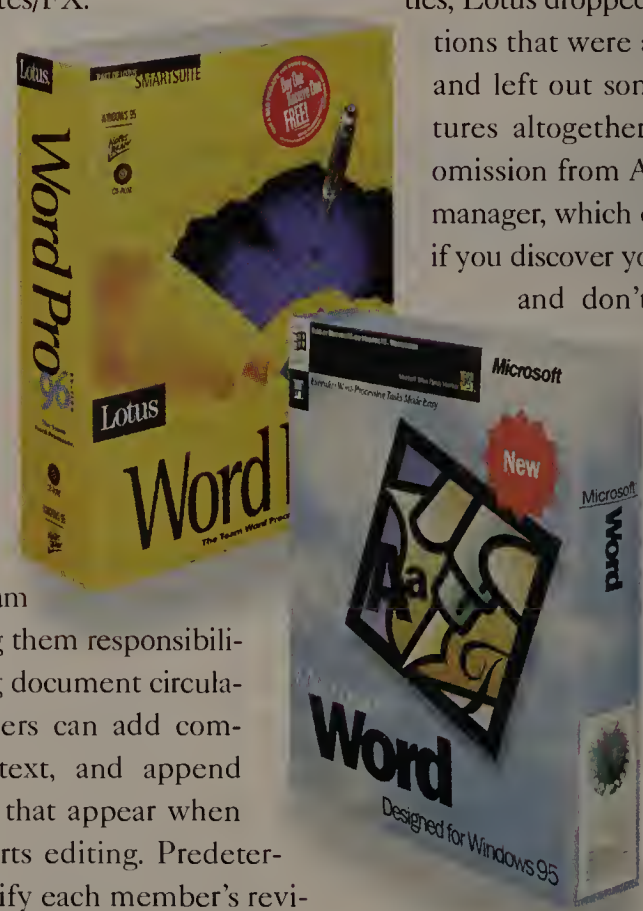
Word Pro 96 lets you see the bottom of one page and the top of the next on the same screen—a feature sorely lacking in Ami Pro. It also offers some unique ways to view documents that aren't found in Microsoft Word 95. You can view the current document's actual size for editing, as well as in thumbnail view for layout, outlining, and other chores. A Page Sorter view shows thumbnails of your document so you can group pages together and drag them around, but switching to the Page Sorter view in long, complex documents can take a while.

Group Efforts

Word Pro 96's workgroup tools are its crowning achievement, surpassing Microsoft Word 95's tools in both power and ease of use. But because the entire program is painfully sluggish on low-end PCs, everyone in the group will need high-powered hardware.

Considering Lotus's emphasis on Notes, Word Pro 96's workgroup strengths are no surprise. You can integrate Notes with Word Pro 96 by using a couple of small utilities—NotesFlow and Notes/FX.

Other features for workgroups, such as Word Pro 96's incomparable TeamReview, are like nothing you'll find in Microsoft Word 95. Word Pro's TeamReview Assistant leads you, step by step, through the process of entering the names of team members, assigning them responsibilities, and controlling document circulation. Team members can add comments, highlight text, and append Post-it–type notes that appear when another person starts editing. Predetermined colors identify each member's revisions. You can save all changes in one document or in separate files. If you have several files, you use TeamConsolidate to compare them, pulling all the changes together and shows them to you in one document. The Version Review dialog bar simplifies the job of creating a final version. The manager clicks on an edit, then accepts or rejects it. The dialog bar lets you select which revision to work on, by version name, editor, or date.



You can also specify how you want to distribute the information to team members in your company. You can insert Notes links directly into documents or use TeamMail to send selected portions of documents. Like Microsoft Word 95, Word Pro also lets you access FTP and World Wide Web files as well as create and edit HTML files.

Word Pro 96 also does a top-notch job of handling long documents. Its tabbed interface is reminiscent of 1-2-3's worksheets. Sections of a document—chapters, indexes, and tables of contents—get separate tabs at the top of the document window. Microsoft Word 95's compound document tools are neither as easy nor as transparent.

Among the Missing

Despite all of Word Pro 96's new capabilities, Lotus dropped a few valuable functions that were available in Ami Pro and left out some Windows 95 features altogether. The most glaring omission from Ami Pro days is a file manager, which can prove invaluable if you discover you've misplaced a file and don't want to exit your word processor to find it. When you launch Word Pro, you can see a list of your files in a dialog box, but selecting *File•Open* won't let you preview them or look for documents. In contrast, Microsoft Word 95's integrated file-searching tools, which come complete with preview screens, are always available in the File•Open dialog box, making it easy to find documents.

In addition, if you have a lot of complex

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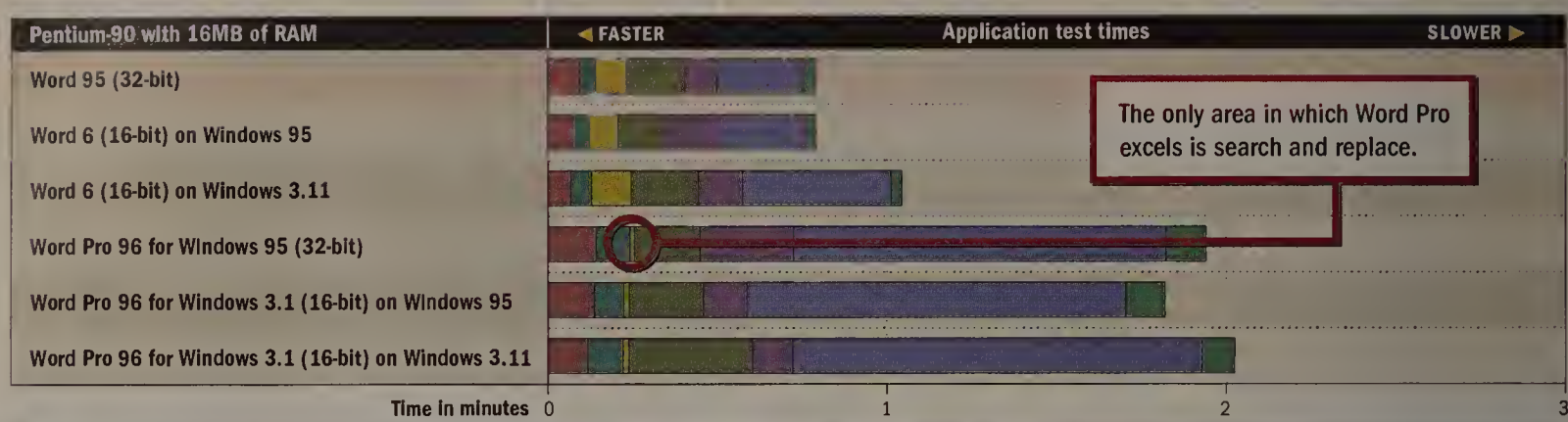
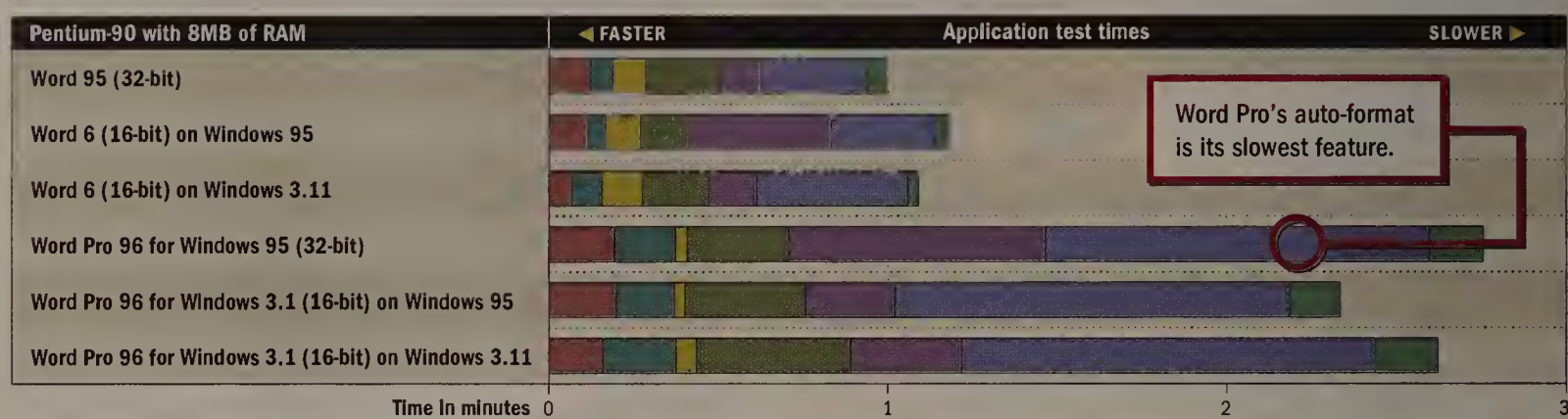
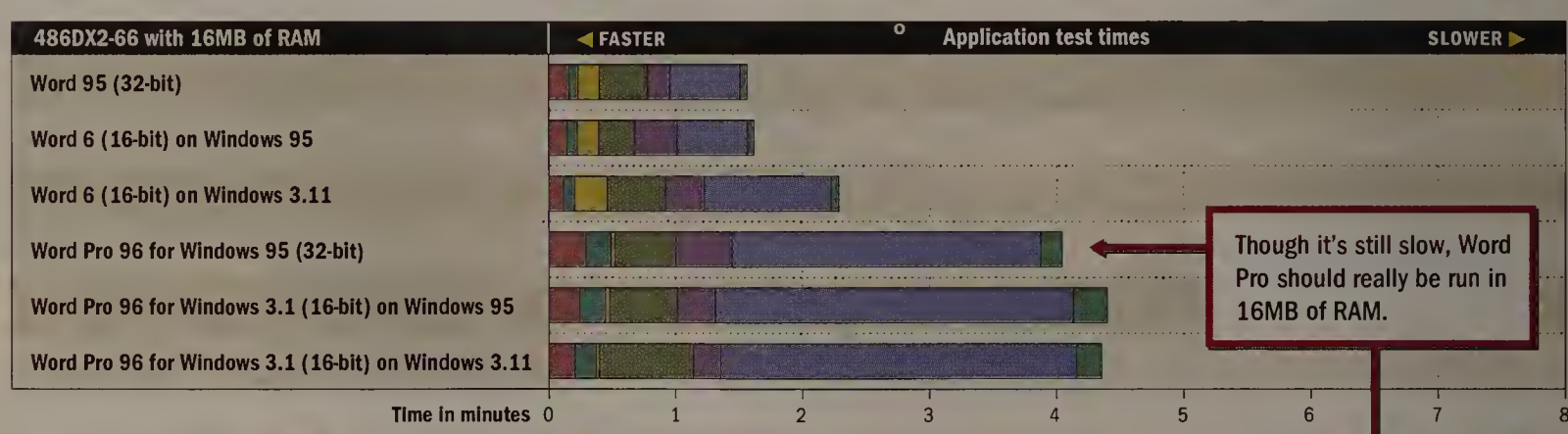
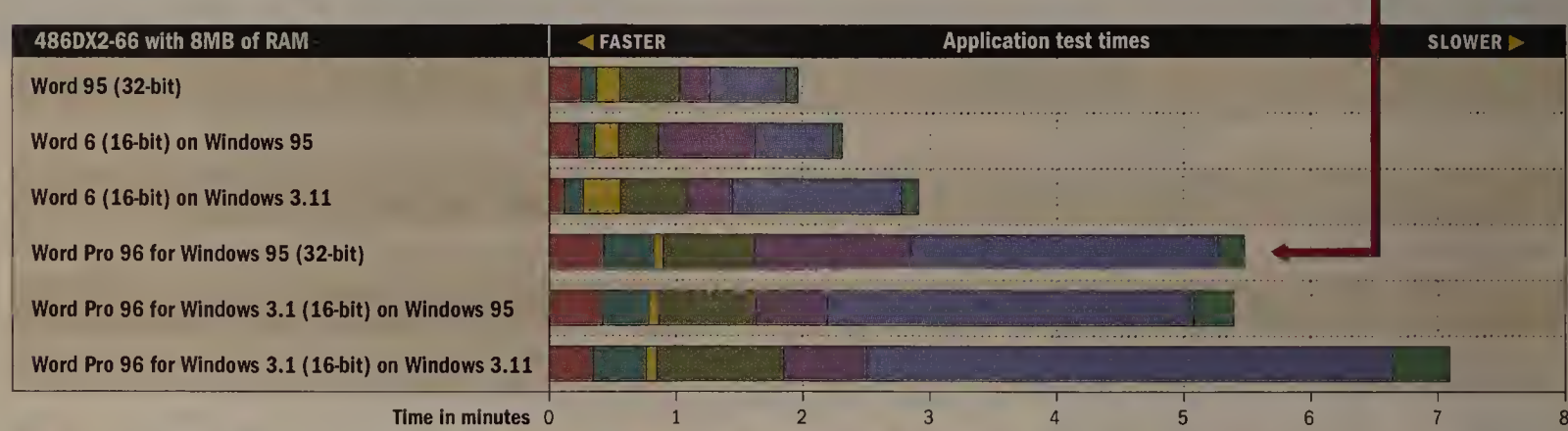
TEST WORKS Word Pro 96 Lags Behind Microsoft Word on Pentium and 486 PCs









Program load · Load document · Search and replace · Save · Print · Auto-format · Import graphic

Methodology The 486 PC was a Gateway 2000 4DX2-66V with 64K of secondary cache, a 325MB IDE hard drive, and an ATI Ultra Pro VLB graphics adapter with 1MB of VRAM. The Pentium PC was a Micron P90 with 256K of secondary cache, an 850MB EIDE hard drive, and a Stealth64 PCI graphics adapter with 2MB of DRAM. The program load test measured how long the application took to launch. The load document test measured how long the application took to load a 50-page document in its native format. The search and replace test replaced 84 instances of the word "Internet" with "information superhighway." The save test recorded how long each application took to save a 50-page document in its native format using the Save As command on the File menu. The print test measured how long the application took to send a 20-page document to a printer. The auto-format test measured how long the application took to format a 50-page document with embedded graphics and OLE objects using the application's recommended settings. The import graphic test measured how long the application took to import a 160K GIF file into a document. All timed tests ended when the user regained control of the cursor. Word 95 results cannot be compared to previously published results because methodology has changed. **Data based on tests designed and conducted by the PC World Test Center. All rights reserved.**

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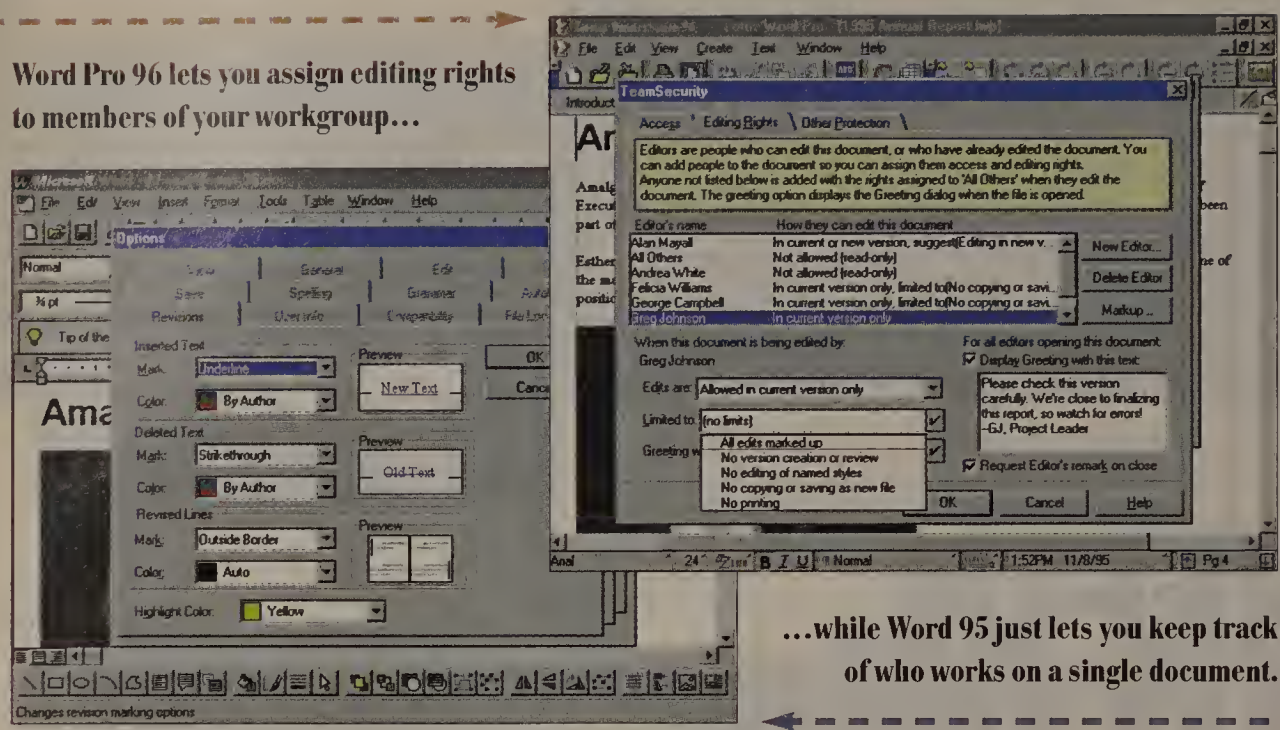
Word Pro 96 lets you assign editing rights to members of your workgroup...



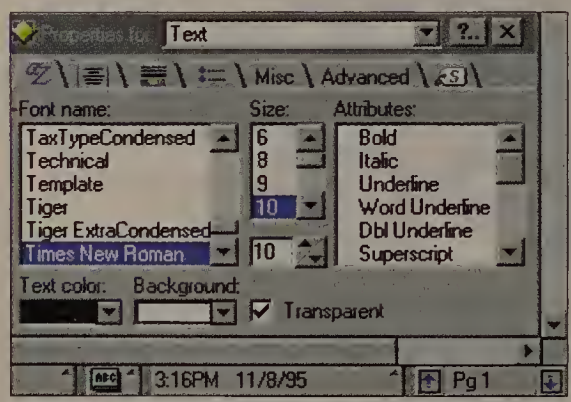
...while Word 95 just lets you keep track of who works on a single document.

Ami Pro scripts, chances are they won't work in Word Pro 96. The program's new macro language, LotusScript, will eventually be the common scripting language for the entire SmartSuite, but right now it's not completely compatible with the Ami Pro macro language (Lotus says it's working on ways to make old Ami Pro macros more compatible). LotusScript is powerful and includes OLE 2.0 automation functions. It is highly object oriented, so if you're familiar with Visual Basic, you should adapt easily.

You also won't find evidence of Windows 95 multithreading in Word Pro 96. To be fair, Microsoft's Word 95 uses very few threads, but the ones it does use can improve productivity. For example, automatic file saving isn't multithreaded in Word Pro, as it is in Word 95, so timed saves interrupt work for longer periods.

Slow, Slow, Slow, and Steady

Slow auto-saves merely hint at Word Pro's most glaring weakness: performance (see the Test Report). We tested the Windows 95 version of Word Pro 96, as well as its Windows 3.1 sibling, on a 486 and a Pentium-90 PC with both 8MB and 16MB of RAM. We then tested Microsoft Word 95 and its Windows 3.1 counterpart, Word 6. Although from a performance standpoint it's clear that moving from Word 6 to Word 95 is a good decision, it's not clear if Word Pro 96 for Windows 95 is a better choice than Word Pro 96 for Windows 3.1. An aggregate of our timed tests shows that the Windows 95 version of Word Pro is faster than the Windows 3.1 version, but in key areas like program loading and document printing, Word Pro 96 for Windows 95 is actually slower. One thing is clear though: No version of Word Pro can keep up with Microsoft Word.



Word Pro 96's context-sensitive InfoBox is one of its best formatting features.

Except in our search-and-replace tests, Word Pro 96 for Windows 95 was slower than Microsoft Word 95 on all hardware configurations—over 330 percent slower running our automatic formatting tests on a 486 with 16MB of RAM (2 minutes, 26 seconds for Word Pro compared to just 33 seconds for Word). Important basic functions like starting the program, opening files, and printing documents were noticeably lethargic, even on our Pentium system. Word Pro 96 for Windows 95 was over 520 percent slower than Microsoft Word 95 at printing a 20-page document on a Pentium with 8MB of RAM (45 seconds for Word Pro, compared to just 7 seconds for Word).

As you would expect, extra memory helps. When moving from 8MB to 16MB, Word Pro 96 for Windows 95 printed over 60 percent faster on both our 486 and Pentium systems. The only place where extra memory made little or no difference was on our auto-format test. In short, for Word Pro 96 to be usable, you'll need a Pentium-90 or better with 16MB or more of RAM—and even then it won't be as fast as Word 95.

While Word Pro 96 for Windows 95 offers some excellent features, especially for workgroups, its poor performance makes it difficult to recommend. In most cases, Ami Pro users will be happier sticking with version 3.1 of that program instead of jumping to Word Pro 96 under either Windows 3.1 or Windows 95. Word 6 and Word 95 users will probably want to stick with the Microsoft line unless they work in a Lotus Notes shop or have trouble tracking lots of document revisions. If you must have a Windows 95 word processor, Word 95 is probably your best bet, because it also has good workgroup tools—though not the equivalent of Word Pro 96's—and much better performance.

If you're a Lotus fan, though, be patient. Future versions will have to address performance issues, and customer feedback will surely lead to improvements. If Lotus combined Word Pro 96 for Windows 95's workgroup features, floating InfoBox, long-document support, and embedded dialog bars with faster performance and features akin to Microsoft Word 95's wizards, AutoFormatting, and proofing tools, the company would set a new standard for word processors.

George Campbell is a contributing editor for PC World. *Testing conducted by Kevin Mitchell and the PC World Test Center.*

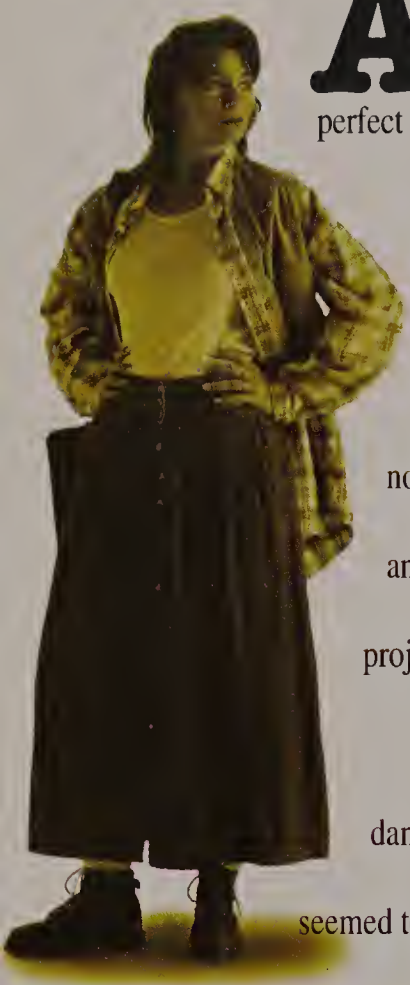
Where to Buy

Microsoft Word 95
List price $339; Microsoft, 800/426-9400
Reader service no. 678

Word Pro 96 for Windows 95
List price $105; Lotus Development Corp., 800/457-0909
Reader service no. 679

Gateway 2000

Portable PCs



Aurora borealis. The perfect excuse to get away.

Made sure the battery on my Gateway Solo™ S5-120XL multimedia notebook was charged, fueled up the truck and headed north. Second quarter projections could wait.

I watched Mother Nature's display dance across the northern sky. And life just seemed to make sense. Looking at my Gateway Solo S5-120XL multimedia notebook I thought, this machine also makes perfect sense. Think of it. A powerful 120MHz Intel® Pentium® processor, active matrix SVGA color display, 40MB RAM, whopping 1.2GB hard drive, and CD-ROM drive. All the power of a high-end multimedia desktop in a portable package. Who needs more?

A German opera filled the night.

I was deep in thought. Thanks to the modular CD-ROM drive and integrated speakers, features found on all models of the Gateway Solo multimedia notebook line, my favorite German opera filled the night.

Suddenly I heard hoofbeats.

GATEWAY2000
S O L O

Turning I found myself face to chest with a large white horse.

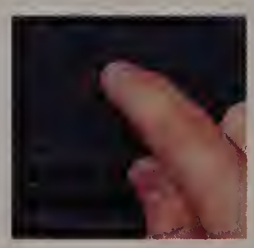
"Hello madam," said the uniformed man atop the horse. "Is that a Gateway 2000 portable? What a coincidence, I have one too!"

Desktop power that fits on a horse.

He reached into his pack and pulled out a Gateway Solo S5-75XL notebook. "My S5-75XL is loaded with a 75MHz Pentium processor, 8MB RAM, and 540MB hard drive. With the 16-bit sound, stereo speakers and a CD-ROM drive, I can use multi-media applications anywhere. Even in the boondocks. And the active matrix SVGA color display provides a great view."

More co more

This value-packed system is ideal for the professional person on the go such as myself. And the best part, it fits on a horse, " he said with a smile. "Gateway 2000® is the place to go for great values on portable PCs. And while you can compute anywhere, I must ask you to cease and desist." I gave him a questioning look. He continued, "It's mating season for many of our furry friends and we wouldn't want the glow from your



EZ Pad™ pointing device for easy cursor navigation.

active matrix color display ruining their plans. Thank you madam and enjoy your evening." And with a tip of his hat, off he rode.

My commune with nature over, I found an offbeat diner and stopped in for some food. I felt someone watching me. As I scanned the room, our eyes met.

He was sitting at the counter, a Gateway Liberty™ small notebook in front of him. He looked vaguely familiar. I pointed to my portable and mouthed, "Gateway 2000." He smiled and gave me a thumbs up. "My Gateway Liberty small notebook is way cool," he said, pulling up a chair. "Powerful and light weight, man. It's just what I need. I'm a poet now. But I used to have a band."

mputing, places.

Gateway Solo notebooks are optimized for Microsoft® Windows® 95.

A band! Memories of him in a silver jumpsuit and platform shoes came flooding back! He'd been plastered all over

I'm telling you, Gateway is just great!

Models from the Gateway Solo multimedia line have a modular CD-ROM drive.

my bedroom walls for years.

"I'm telling you, Gateway 2000 really takes care of their customers. I can get telephone technical support anytime. And Gateway's values are just out of this world. Hey, you wanna come over to my place and listen to some vinyl?" I had a feeling my adventures were just beginning.

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- Modular 2X CD-ROM Drive
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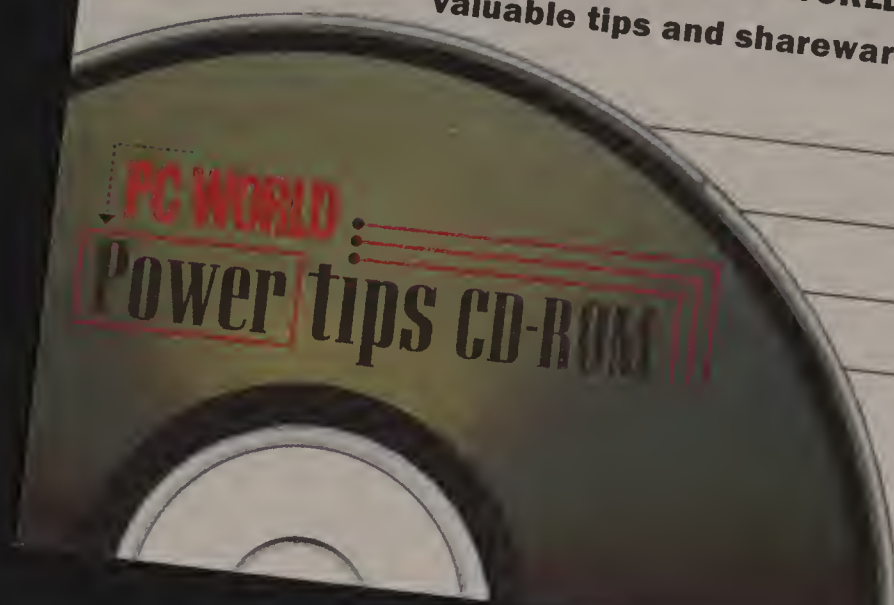

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Instead of upgrading your hard disk, why not just pop in a new cartridge? Priced from $200, these nine drives hold from 100MB to 650MB per cartridge—and some are as fast as hard disks.

Incredible EXPANDING Drives

By Eric Knorr

Like a pernicious virus created by an evil hacker, data has mushroomed out of control. Ordinary document files now bulge with graphics and fancy fonts, while sound infiltrates everything from online services to PC-based voice mail. E-mail, faxes by modem, and scanned pages turn everyone into a document archiver. And the sizes of applications surge with every revision, especially now that 32-bit Windows 95 versions have arrived. Have you ever dabbled in video? Suddenly that new gigabyte hard disk may not seem so vast after all.

LOUIS FISHAUF

The removable cartridge drive is an idea whose time has come. Like an overgrown floppy drive, it promises unlimited, transportable storage using cartridges that hold hundreds of megabytes. Once intended for those who need to put their data under lock and key, removable cartridge drives are now attracting the multitudes who find their hard disks cramped. Why? A sudden plunge in price and a big jump in performance.

In this review, we evaluate nine drives priced from $199.95 to $749 that promise storage capacity ranging from 100MB to 650MB per cartridge. We also preview a preproduction unit of the Iomega Jaz, a $599 drive that offers a 1GB cartridge (see "Not Yet Ready for Prime Time: Iomega Jaz").

We compared external models where possible, with the idea that one drive could be used for archiving, backup, or data transfer with several PCs (provided they are equipped with SCSI adapters). We also reviewed the parallel port versions of the Fujitsu DynaMO 230 and the Iomega Zip. The Best Buy goes to the SyQuest EZ135, a $239 drive with $19.95 cartridges that delivers performance as fast as a hard disk's.

The Media Age

Along with evaluating performance, durability, and convenience, we compared the cost per megabyte based on the price of the drive plus the price of 2 gigabytes' worth of storage. We used the actual formatted capacity of a cartridge rather than the larger unformatted capacity advertised by the vendors. At approximately 25 cents, the cost per megabyte of hard disks is still tough to beat. The SyQuest EZ135 at 27 cents and the Iomega Zip at 30 cents come the closest of the products in this review.

If you're simply looking to back up your hard disk, you're better off sticking with a tape backup system. At 5 cents per megabyte, nothing beats the low cost and convenience of tape backup drives.

Cost aside, the first question you should ask yourself is, How long do I want the data on my cartridges to last? Magnetic media, such as that used by Iomega and SyQuest, has a half-life of five to seven years—that is, the magnetic charge weakens to half its original strength over that period of time. Optical media devices generally trade performance for longer-lasting storage. Rewritable optical media, such as that used by magneto-optical and phase-change drives, holds data for 30 years or more and can be rewritten virtually ad infinitum. Furthermore, both are impervious to magnetism—from speakers, electric motors, bulk erasers, and the like.

Best Buy

SyQuest's EZ135 outperformed all the other drives reviewed here, running in some cases at least 40 percent faster than its closest market rival, the Iomega Zip. Although the EZ135 is not as compact as the Zip, its low cost per megabyte and higher-capacity cartridges make it the drive of choice for storing large files and running applications.

Another factor to consider is the durability of cartridges, an attribute measured in *drop height*—the distance you can drop a cartridge onto a hard floor without rendering it unplayable. The Iomega cartridges (except for the Jaz's) contain floppy disks, so you can drop them from a height of 8 feet without causing debilitating damage. The SyQuest disks are essentially hard disk platters in a sheath and are more vulnerable to damage, with drop heights of around 3 feet. MO and phase-change disks have a drop height of 30 inches, but this spec is somewhat misleading. The cartridge casings may break, but the disks inside are virtually indestructible.

Speed and the Job at Hand

We chose four benchmarks to compare the speed of the drives. We timed how long it took to transfer data from the hard disk to the removable cartridge, open and save a 15.5MB file, and perform a database query. Among the drives we reviewed, the clear winner was SyQuest's EZ135, which came the closest to matching the performance of the fast SCSI disk we used for reference.

As the Fujitsu DynaMO 230 and the Iomega Zip demonstrate, one way to guarantee slow performance is to opt for a parallel port connection. If you must use a parallel port device, at least make sure the PC you want to hook up with has an enhanced parallel port.

Setting Up Shop

Do the words *Plug and Play* mean anything to you? Well, even though we ran our tests under Windows 95, you won't see that phrase here. With the exception of the parallel port versions of the Fujitsu DynaMO 230 and the Iomega Zip, all the drives used SCSI cards we had to configure manually. For the parallel versions, installation consisted of simply plugging the drive into the parallel port and running the necessary software.

Under Windows 95, getting a SCSI card and drive to work is easy: You select your SCSI card from the SCSI controllers list in the Add New Hardware Wizard, make sure the suggested addresses match the settings on the card, and reboot the system. (Iomega's Windows 95 software alone enables you to install its drives without using Add New Hardware.)

The whole intent of removable cartridge drives is to add to your existing storage seamlessly. For those who need to archive large documents, a magneto-optical or phase-change drive can provide a huge, nearly permanent repository. But for most of us, a fast magnetic drive such as the SyQuest EZ135 will buy room to move for the price of a $20 cartridge. With a little luck and the right drive, you'll stop worrying about space limitations and use that endless elbowroom to get better organized.

Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible *(Peachpit Press, 1995, 800/283-9444).*

For more information about all products in this article, circle reader service no. 905.

Fujitsu DynaMO 230 Parallel Port

Formatted capacity: 216.9MB
Cost per megabyte: 31¢
Performance: Fair

Compact, fairly light, and with a low cost per megabyte, the Fujitsu DynaMO 230 Parallel Port would make a reasonable choice as a shared archiving or backup unit. The DynaMO's last-place performance was not surprising, due to its parallel port interface. But the convenience of this drive and the longevity of its magneto-optical media make it worth considering.

The MO disks comply with the ISO standard, which means they can be read by most other MO drives. The 3½-inch MO cartridges are only slightly thicker than 3½-inch floppies, and they pop in and out with floppylike ease. And you can't beat the durability of the media—Fujitsu even offers a lifetime warranty. The company provides one of the better support policies, offering a toll-free number and 10 hours of daily support. If speed is a low priority and copying data from multiple machines is high on your list, the DynaMO 230 Parallel Port is a fine choice. *Fujitsu Computer Products, 800/626-4686, 408/432-6333.* **Reader service no. 681**

Fujitsu DynaMo 230

Iomega Bernoulli 230

Iomega Bernoulli 230 Transportable

Formatted capacity: 219.9MB
Cost per megabyte: 73¢
Performance: Good

The Iomega Bernoulli was the first successful removable cartridge drive. This latest variation boasts improved speed and capacity, with the ability to read and write to six previous generations of cartridges. But with the highest cost per megabyte, the Bernoulli 230 bears considering only if you've invested in the technology.

Well-crafted utilities make installing and using the drive a snap under Windows 95; with earlier Windows versions, you'll find the software clunkier.

Though slower than comparable SyQuest drives, the Bernoulli offers more durable cartridges—they can be dropped from a height of 8 feet without damage. But they're also big, bulky, and expensive. You can find faster, cheaper, and more compact solutions elsewhere. Iomega is the only vendor here that does not provide a toll-free support line. *Iomega Corp., 800/697-8833, 801/778-1000.* **Reader service no. 682**

Iomega Zip

Formatted capacity: 95.9MB
Cost per megabyte: 30¢
Performance: Good

When it comes to removable storage, *fun* isn't exactly the word that springs to mind, but that's exactly what the Zip drive is.

Not Yet Ready for Prime Time: Iomega Jaz

Formatted capacity: 1020.9MB
Cost per megabyte: 35¢
Performance: Excellent

Can it be true? The $599 Iomega Jaz not only performs like a hard disk, but its storage capacity rivals hard disks', with 1GB cartridges. Could this be the removable hard disk replacement we've been waiting for? Possibly. We were unable to obtain an external model in time for this review, but we did look at the internal version (which was still not shipping at press time). We also ran it through our performance tests and were impressed by the unrivaled specs and performance results of this soon-to-be-released drive.

The Jaz cartridges are a little bit smaller than a floppy, sheathing platters that spin at 5400 rpm, the same speed as a hard disk. In each test, the Jaz beat every other drive, including the SCSI hard disk we used for reference. Along with speed and economy, you get a small footprint. The external version weighs 2 pounds; the internal model slips in a 5¼-inch, half-height bay.

Although the Jaz offers the highest storage capacity of the drives we looked at, we're nervous about having a gigabyte per cartridge without further testing—especially since Jaz cartridges have a drop-height rating of only 3 feet. Watch this space, and we'll let you know if the Jaz lives up to its bright promise. Reader service no. 712

The soon-to-be-released Iomega Jaz

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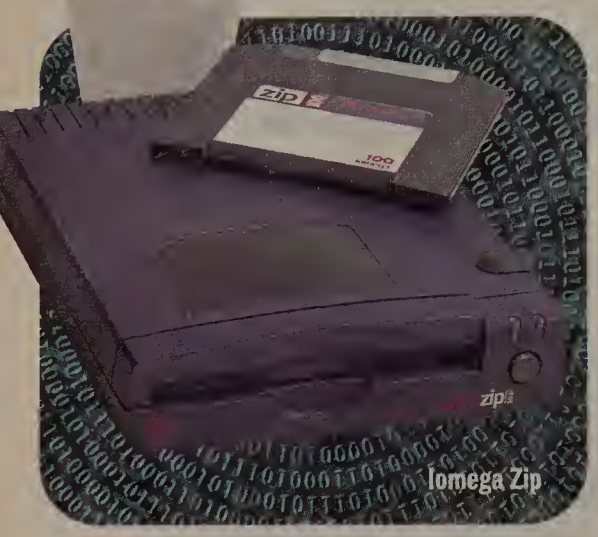
Weighing about a pound and measuring about one and a half times the size of a Sony Walkman, the Zip is both stylish and designed to be a sort of go-anywhere personal data safe, a concept that's sure to be a hit thanks to the drive's low cost per megabyte.

Convenience is the Zip's biggest advantage. Under Windows 95, the drive practically installs itself, circumventing the Add New Hardware routine and adding its utilities to the Zip drive icon's right-click menu. But with mere 100MB (unformatted) cartridges, the Zip isn't the best choice for serious multimedia or desktop publishing storage. Nor would you want to use the drive for running applications—the SCSI model was one of the slowest SCSI drives we tested, and the parallel version crawls. Still, for those who need to shuttle good-size hunks of data, the lightweight Zip drive is a good choice. *Iomega Corp., 800/697-8833, 801/778-1000.* **Reader service no. 683**



Iomega Zip

Olympus PowerMO 230

Olympus PowerMO 230

Formatted capacity: 216MB
Cost per megabyte: 38¢
Performance: Good

The faster of the two magneto-optical units we tested, the PowerMO 230 achieved near hard disk speeds in all but the data transfer test, testimony to what a 1MB buffer and 4500 rpm can do. Such performance makes this SCSI drive a good choice for running programs or as a fine archiving device, thanks to long-lived MO cartridges.

FEATURES COMPARISON From 100MB to 1GB, Removable Cartridge Drives Offer Storage Solutions for Everyone

● = Yes ○ = No
n/a = not applicable

Standard features	Fujitsu DynaMO 230 Parallel Port	Iomega Bernoulli 230 Transportable	Iomega Jaz	Iomega Zip	Olympus PowerMO 230	Plasmon PD/CD PD2000e	SyQuest EZ135
Drive/media street price	$449/ $20	$475/ $109	$599/ $99	$199.95/ $19.95	$589/ $20	$675/ $48	$239/ $19.95
Interface(s)	parallel	SCSI	SCSI	SCSI, parallel	SCSI	SCSI	SCSI, IDE
SCSI interface price	n/a	$199	$59.95	$59.95	included	included	$119
Parallel pass-through	●	n/a	n/a	●	n/a	n/a	n/a
Technology	MO	magnetic	magnetic	magnetic	MO	phase change	magnetic
Depth x width x height (inches)							
Internal model	8.2 x 5 x 1.4	8.1 x 5.8 x 1.6	5¼ half-height	5¼ half-height	n/a	n/a	5.9 x 4 x 1
External model	8.2 x 4.8 x 1.5	11.8 x 9.8 x 2.8	8 x 5.3 x 1.5	7.3 x 5.4 x 1.5	8.2 x 5.7 x 3.5	10.5 x 8.3 x 2.3	8.5 x 4.8 x 2.1
Weight of external model (pounds)	2	8.1	2	1.1	5.6	5.5	2.3
Capacity and formatting							
Unformatted capacity (MB)	230	230	1024	100	230	650	135
Formatted capacity (MB) [1]	216.9	219.9	1020.9	95.9	216	633	126
Readable disks	230/ 128MB	230/150/ 105MB	1070/ 540MB	100/ 25MB	230/ 128MB	650 PD, CD-ROM	135MB
Media size (inches)	3½	5¼	3½	3½	3½	4¾	3½
Service and support							
Drive/media warranty (years)	1/lifetime	5/5	1/lifetime	1/lifetime	2/lifetime	1/30	2/5
Toll-free support	●	○	○	○	●	●	●
Daily support (hours)	10	10	10	10	8	11	14
Weekend support	○	○	○	○	○	○	●

BEST BUY

[1] As reported by Windows 95.

Installing the drive proved awkward because the bundled Future Domain SCSI card (the TMC-1610M/MER/MEX) lacks a Windows 95 driver. But if you let the Add New Hardware Wizard search for the closest match, you'll find that the driver works just fine, as long as you make sure the resources listed in Device Manager match the switch settings on the card. For Windows 3.*x* and DOS installation, you use CorelSCSI, a complicated install and test utility.

With a 5½-pound heft, the PowerMO would be best used as an auxiliary device for a single desktop publishing or multimedia workstation. Magneto-optical media continues to gain ground in these applications, and Olympus's drive stands as the better of the two magneto-optical units we tested. Olympus provides a toll-free support line, but its support time is shortest, at 8 hours. *Olympus Image Systems, 800/347-4027, 516/844-5000.* **Reader service no. 684**

	SyQuest SQ3270	SyQuest SQ5200	Toray PC Phasewriter Dual
	$400/ $55	$500/ $70	$749/ $59
	SCSI	SCSI	SCSI
	$119	$119	included
	n/a	n/a	n/a
	magnetic	magnetic	phase change
	n/a	n/a	7.7 x 5.8 x 1.6
	8.1 x 7.1 x 2.1	8 x 5.8 x 1.6	10.6 x 8.3 x 2.4
	3.8	2.8	8
	270	200	650
	255.9	189	633
	270/ 105MB	200/88/ 44MB	650 PD, CD-ROM
	3½	5¼	4¾
	2/5	2/5	1/lifetime
	●	●	●
	14	14	9
	●	●	○

Plasmon PD/CD PD2000e

Formatted capacity: 633MB
Cost per megabyte: 41¢
Performance: Good

Still haven't bought a CD-ROM drive? Are your storage needs humongous? Then you may want to consider the Plasmon PD/CD PD2000e, a quad-speed CD-ROM reader and phase-change optical storage device.

The PD2000e comes with its own SCSI card—in this case an Adaptec AHA 1510, which Windows 95 supports. (For earlier Windows versions, you run Adaptec's EZ SCSI utility.) Once installed, the PD2000e appears as two drives on your PC, the first for phase-change cartridges and the second for CD-ROMs.

Phase change is relatively new to the removable storage market and currently lacks the popularity of magneto-optical. The drive itself has a low mean-time-between-failures rating, so there's some element of risk in buying into this technology. If you want to add both a quad-speed CD-ROM drive and the ultimate archive machine to your PC in one shot, then the PD2000e is your best bet. Plasmon provides a support policy second only to SyQuest's, offering a toll-free number and 11 hours of daily support. *Plasmon Data Inc., 800/445-9400, 408/956-9400.* **Reader service no. 685**

SyQuest EZ135

Formatted capacity: 126MB
Cost per megabyte: 27¢
Performance: Excellent

An obvious response to Iomega's Zip drive, the SyQuest EZ135 ran about 40 percent faster in our performance tests and delivers a cost per megabyte that's 3 cents lower, thanks to larger 135MB (unformatted) cartridges. Price and speed—plus a two-year warranty on the drive—make the EZ135 the Best Buy for those who need to off-load bulging hard disks or even run programs at hard disk speed.

SyQuest EZ135

Though SyQuest has a winner here, the company does need to make some improvements to match the ease of the Zip drive. For starters, SyQuest ships its cartridges in Macintosh format, which means you must "flip" the cartridges from Mac to PC format using a utility that worked only intermittently under Windows 95. You can reformat the cartridges—but that destroys the free archiving and document management software that comes with the drive. Moreover, the EZ135 also sports a somewhat unfriendly button/lever system: To mount a cartridge, you slip it in and slide the lever to the right; to eject, you press a button to unlock the lever, which you then slide to the left.

Plasmon PD/CD PD2000e

At over 2 pounds, the EZ135 is more than twice as heavy as the Zip, so you might not be as enthusiastic about lugging it around. In addition, because the EZ135 is less popular, you'll be less likely to find other drives that will take your disks. But you can't argue with the numbers: For a buy-in price a little higher than a tape backup's, you get hard disk speed and inexpensive cartridges that are roomy enough for most personal data storage needs. SyQuest also delivers the most generous support policy here, providing a toll-free phone number and seven-day support. If you're looking for higher-capacity

storage, keep an eye on SyQuest and Iomega. A 1.3GB drive from SyQuest is expected in the first half of this year, and the Iomega Jaz should be available at press time. *SyQuest Technology Inc., 800/245-2278, 510/226-4000.* **Reader service no. 686**

SyQuest SQ3270

Formatted capacity: 255.9MB
Cost per megabyte: 39¢
Performance: Excellent

The SyQuest SQ3270 is essentially a bigger, heavier version of the EZ135 that spins 3½-inch cartridges with double the capacity. You get virtually the same hot performance, but the pricey $55 cartridges exact a higher cost per megabyte. And when you consider that magneto-optical cartridges are only 40MB smaller but cost $35 less, you have to wonder where the SQ3270 fits in.

The SQ3270 has the same button/lever system as the other SyQuest drives we tested. Installation is also identical to that of the EZ135, with the same Mac-configured cartridge and clunky installation software.

This is a quick drive, but the cartridge capacity isn't that great, and the price could be better. If you want the speed of magnetic storage and need a higher-capacity cartridge than the EZ135, check out the upcoming 1.3GB drive from SyQuest—or the Iomega Jaz, expected to be available at press time. *SyQuest Technology Inc., 800/245-2278, 510/226-4000.* **Reader service no. 687**

SyQuest SQ5200

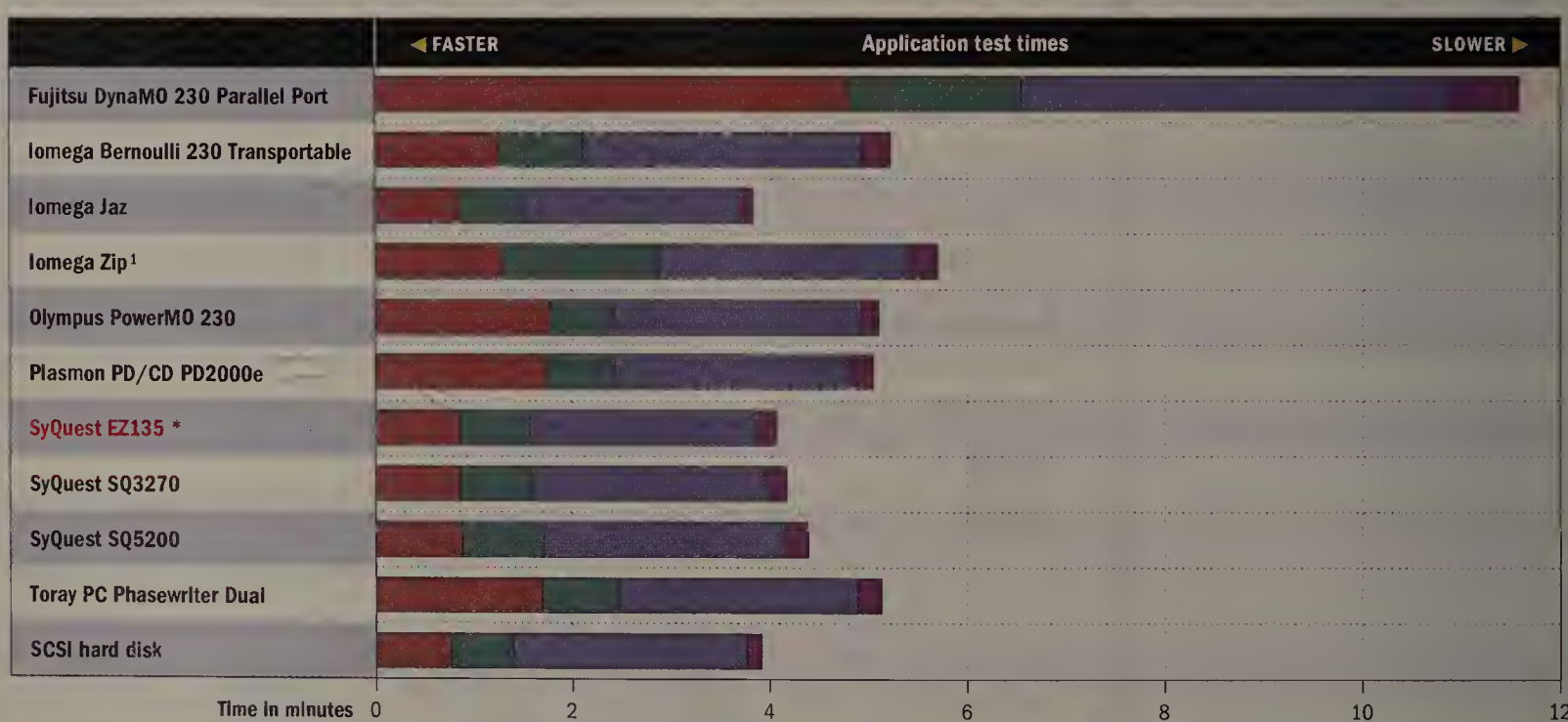
Formatted capacity: 189MB
Cost per megabyte: 60¢
Performance: Excellent

If you're a professional desktop publisher, you may have no choice but to consider the SyQuest SQ5200, since its 5¼-inch cartridges are the de facto standard among service bureaus. Along with the newer 200MB

(unformatted) cartridges we used in our evaluation, this drive reads and writes the SyQuest 88MB and 44MB cartridges that have been in circulation for years.

The performance, although it falls a bit behind that of the EZ135 and the SQ3270, is excellent. But the same installation issues as the other SyQuest drives, hefty size and weight, and bulky cartridges that have a 3-foot drop height do little to recommend this drive. Worst of all is the high cost per mega-

TEST REPORT SyQuest EZ135 and Iomega Jaz Rival Hard Disk Speed



* Best Buy

[1] Results for SCSI version only. Due to a problem with the Compaq's parallel port, Windows 95, and the drive itself, we could not obtain reliable numbers for the parallel model. But informal tests of the parallel model on a comparable P-75 without this problem resulted in extremely slow performance.

Methodology All drives were tested in a Compaq ProLinea P-75 with 16MB of RAM using the interface adapters and drivers from the vendors and running Windows 95. All programs used in the tests were stored on the system's 1GB IDE hard drive; only data files were stored on the removable media.

Data transfer
We expanded a 19MB PKZip 2.0 file from the test system's hard drive onto the removable media. The expanded file was 35MB.

Open Photoshop file
We opened a 15.5MB Photoshop image file.

Save Photoshop file
We flipped the image in the 15.5MB Photoshop file and saved the file under the same name.

Paradox for Windows database query
We performed an indexed, joined multitable query on four database files totaling 7MB.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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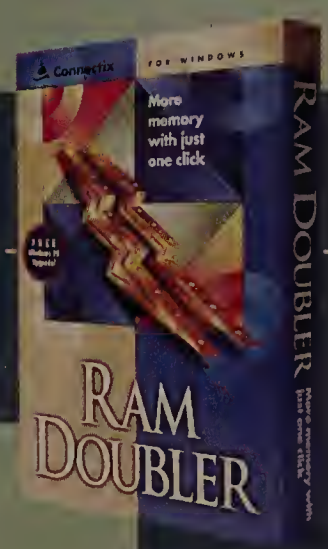

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byte, second only to that of the Iomega Bernoulli 230 Transportable.

Like the Bernoulli, the SyQuest SQ5200 represents yesterday's technology. If you have an existing investment in SyQuest cartridges, or you deal with companies that demand them, then the speed and increased capacity of this drive might make it a worthy upgrade from your old SyQuest workhorse. Otherwise, steer clear. *SyQuest Technology Inc., 800/245-2278, 510/226-4000.* **Reader service no. 688**

Toray PC Phasewriter Dual

Formatted capacity: 633MB
Cost per megabyte: 46¢
Performance: Good

Like the Plasmon PD2000e, the Toray PC Phasewriter Dual accepts both 650MB (unformatted) phase-change cartridges and standard CD-ROMs, making it a good choice for those with huge, long-term storage needs.

Toray bundles an Adaptec AVA-1515 adapter with the Phasewriter. Once the card is installed under Windows 95 and the drive plugged in, the Phasewriter obligingly appears as the last drives on your system without the need for additional configuration. Similar to the Plasmon PD2000e, the Phasewriter is represented as two drives, the first for phase-change cartridges and the second for CD-ROMs.

Phase change may not be the most popular removable storage technology as of yet, but it shows promise. If magento-optical isn't large enough for your data storage needs, your best bet is to turn to a phase-change drive. If you do go this route, however, you'll be better off with the Plasmon, which has a lower cost per megabyte. Like most of the others, Toray offers a toll-free support line, but its support hours are among the shortest—only 9 per weekday. *Toray Optical Storage Solutions, 800/867-2973, 415/341-7152.* **Reader service no. 689** ■

Toray PC Phasewriter Dual

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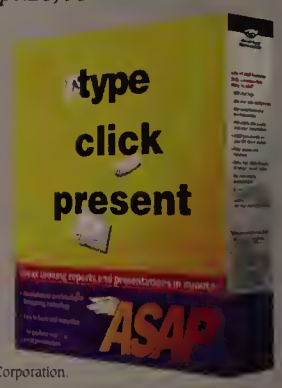

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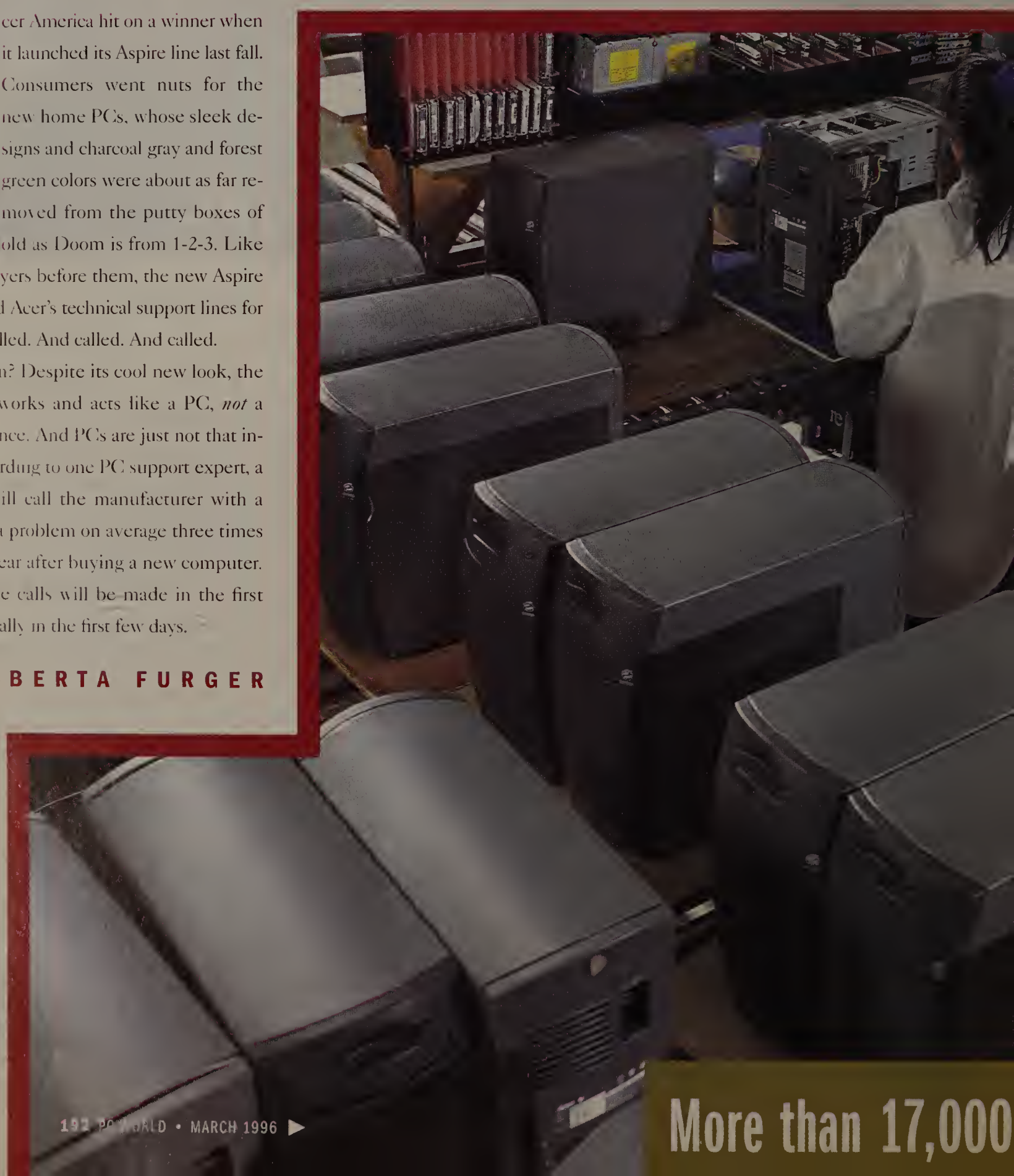
PC RELIABILITY AND SERVICE

Homeward Bound

Acer America hit on a winner when it launched its Aspire line last fall. Consumers went nuts for the new home PCs, whose sleek designs and charcoal gray and forest green colors were about as far removed from the putty boxes of old as Doom is from 1-2-3. Like many PC buyers before them, the new Aspire owners called Acer's technical support lines for help. And called. And called. And called.

The reason? Despite its cool new look, the Aspire still works and acts like a PC, *not* a home appliance. And PCs are just not that intuitive. According to one PC support expert, a consumer will call the manufacturer with a question or a problem on average three times in the first year after buying a new computer. Two of those calls will be made in the first month—usually in the first few days.

BY ROBERTA FURGER



BOB HOLMGREN (LOWER LEFT), MICHAEL ABRAMSON (UPPER RIGHT)

More than 17,000

or

Acer's San Jose, California, manufacturing site is full to overflowing (left). Aspire owners Craig and Ann Dowden of Gurnee, Illinois, love their new PC—but could do without the long waits for technical support.

Bound for Trouble?

readers rate their PCs and the companies that make them.

Case in point: The number of consumers calling Acer's technical support line nearly tripled between September and October, reaching a high of 5600 calls a day; 60 percent of all the calls coming in were from new Aspire owners. It's not that Acer's PCs are more prone to trouble than those of most of its competitors. In fact, they are rated average for reliability. Among Acer owners who bought their PCs in the last two years and who responded to *PC World*'s Reliability and Service Monitor, the problem rate averaged 47 percent. The overall DOA rate (that is, a component was not functioning when the PC first arrived) was 12 percent. But Acer (and just about every other company with a successful home product) has found that the nifty new features now standard on home PCs—like bundled software, telephony capabilities, and Internet browsing tools—bring with them demand for an added level of support.

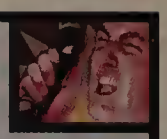
Acer doubled its technical support staff last fall by opening a second facility in San José, Costa Rica, and is on a hiring blitz for its San Jose, California, facility as well. The additions are paying off in some—but not all—areas, according to Acer computer owners who responded to *PC World*'s Reliability and Service Monitor. Since our last report, the company has managed to cut an impressive 12 hours off the length of time customers had to wait before they could speak with someone who could help them with their problem (from 26 to 14), and shaved a full day—some 24 hours—off its problem resolution time. But the number of reported problems that were never resolved has increased by roughly one-third, from 10.2 to 13.7 percent, which is one of the highest rates of any company in this report.

Craig and Ann Dowden, of Gurnee, Illinois, say their Acer Aspire, a Pentium-100 that they purchased last November, is everything they could have hoped for in a home PC. There's just one small problem: You need the patience of Job—and a portable phone—to get through to the company's technical support.

When the couple finally got through to Acer's toll-free technical support line about a problem with their PC speakers, they waited about two hours before they were able to speak with a technician who could help them resolve their problem, recalls Craig Dowden. "We waited on hold for an hour and ten minutes, then explained our situation to someone who told us we would have to speak with a technician. That took another 50 minutes," says Craig. "We'd already invested so much time that we decided to wait," he adds, noting that he and Ann took turns holding the phone.

"They were very apologetic and solved the problem in about ten minutes," says Craig. "But it took too long [for us to get through]." Says Olend King, Acer's vice

MOST LIKELY TO...



...say, "Have a nice day!"		...give you a hard time	
Company	**Rating**	**Company**	**Rating**
Apple	4.2	Comtrade	3.2
Dell	4.2	Quantex	3.6
Micron	4.2	Zeos	3.6

Average courtesy rating for all companies: 3.9

Ratings are on a scale of 1 to 5, with 1 being low.
Source: Based on ratings of technical support personnel for courtesy in PC World's Reliability and Service Monitor, May 20 through November 20, 1995.

Since the launch of Windows 95, you can't get through to technical support in less than an hour. —Esther Miller, New York City

PETER GREGOIRE

president of service, "with the level of growth the company is experiencing, it's a challenge to keep up."

Heading Home

Acer, like its competitors, is grappling with the industry's dramatic shift in focus to the home. In the last two years, just about every prominent PC company has introduced a line of home PCs, and the resulting market has driven product design and support. Virtually all the companies—from Compaq, which has been riding high since debuting the Presario three years ago, to Packard Bell, which is struggling to stay on top in the home market—are experiencing major changes as they look for new ways to tackle the age-old problem of customer service.

At Acer's Fremont headquarters, the carpet is stained and in need of replacement, the telephone system is outdated, and the company's information systems are taxed to their limits. King apologizes for the sorry state of the carpet and says that he expects a major overhaul of the phones and the information systems by midyear. His support staff will likely double again by the end of 1996. As for the carpet, he's waiting to see if Acer moves to larger quarters before sprucing up the existing site.

Packard Bell's facility has ten times the staff of Acer's, but it, too, is bursting at the seams. Located in a suburban strip mall just outside of Salt Lake City, the facility was empty in January 1994; today it houses 1500 technicians. John Hlavac, Packard Bell's vice president of support, wonders how long it will be before he has to move into the adjacent space now occupied by a video rental business and a grocery store.

As for Compaq, its customer support staff moved off-site at the end of last year. The department had grown so large that it could no longer fit comfortably in its offices.

One Step Forward, Two Steps Back

For over three years, *PC World* has polled readers about their reliability and service experiences with their PCs. During that time, we've been flooded with more than 215,000 responses covering companies as diverse as Comtrade and Compaq, IBM and Insight. In this update, we analyze the responses of roughly 17,800 readers, all of whom returned questionnaires between May 20 and November 20, 1995, and who had bought a PC within the last two years (since November 1993). From those responses, we've rated 19 PC manufacturers (all the companies about which we received at least 100 responses) on both objective criteria, such as problem rates and repair times, and subjective measures like whether customers who responded say they would buy from the company again.

Only a few companies—most notably Apple, Compaq, and Hewlett-Packard—have managed to stay one step ahead of the game, consistently achieving top scores in our ratings of both reliability and service. At the other end of the spectrum are companies like Comtrade and Midwest Micro in reliability or Packard Bell and Zeos in service. Despite sometimes significant investments and lots of promises, our analysis indicates that these companies have simply been unable to turn things around.

In-between these two extremes, there have been some wild fluctuations: Gateway 2000's service once looked like it was in free fall, but it has shown continual improvement since hitting rock bottom last spring. Dell and Micron have both suffered setbacks in service; while Dell seems to have corrected its problems, Micron—and its customers—are still struggling. But the Boise, Idaho, company is making impressive improvements in reliability, moving from being one of the worst-rated companies in our June 1994 report to ranking among the best PC manufacturers this time around.

Winners and Losers

Four companies—Apple, Compaq, Digital, and Hewlett-Packard—have achieved top ratings in both reliability and service, earning them a "Best" rating in the overall category. Other top performers include Dell, which earns a "Best" rating for service, and Micron, which is rated among the best for reliability. IBM, which earned a top rating in our December 1994 report, drops back down to the second tier in the overall rankings.

OVERALL	RELIABILITY	SERVICE
BEST	**BEST**	**BEST**
Apple	Apple (163 responses)	Apple (38 responses)
Compaq	Compaq (1226)	Compaq (331)
Digital	Digital (186)	Dell (403)
Hewlett-Packard	Micron (608)	Digital (44)
	Hewlett-Packard (218)	Hewlett-Packard (50)
		IBM (333)
GOOD	**GOOD**	**GOOD**
Dell	AST (449)	Compudyne (48)
IBM	Dell (1478)	Micron (155)
Micron	IBM (1146)	NEC (43)
NEC	NEC (155)	
FAIR	**FAIR**	**FAIR**
Acer	Acer (494)	AST (138)
AST	Gateway 2000 (3069)	Gateway 2000 (1032)
Compudyne	Leading Edge (163)	Midwest Micro (76)
Gateway 2000	Packard Bell (1684)	Quantex (212)
Leading Edge		
POOR	**POOR**	**POOR**
Midwest Micro	Compudyne (156)	Acer (172)
Packard Bell	Pionex (137)	Leading Edge (64)
Pionex	Quantex (541)	Pionex (56)
Quantex	Zeos (497)	
WORST	**WORST**	**WORST**
Comtrade	Comtrade (100)	Comtrade (43)
Zeos	Midwest Micro (161)	Packard Bell (608)
		Zeos (181)

Source: PC World Reliability and Service Monitor, based on questionnaires returned between January and July 1995. See following pages for complete method.

Research, Research, Research

Given the wide variations in reliability and service records, it's understandable that home PC buyers—who lack the benefits of an in-office tech support staff—are particularly cautious. Take Steve Shoup of West Palm Beach, Florida, for example. Shoup spent six months researching home computers before he finally plunked his money down for a new Pentium-75. He read reviews, pored over product specifications, and compared reliability and service ratings among several leading brands. Ultimately, he decided on a Starion, one of Digital's new home PCs, because of the company's reputation for providing quality products and service.

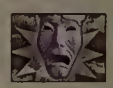
The research paid off. So far, Shoup's PC has been trouble-free, with no hardware problems, no software glitches—and no reason to call the company's technical support line. In short, the dream experience. And Shoup is not alone. In *PC World*'s surveys, Digital has consistently been among the highest-rated companies for reliability. In this report, it has the lowest system DOA rate and the second lowest problem rate.

"I haven't needed them much in the way of technical help, but it's nice to know the service is there when you do need it," says

Best to Worst: Rating Reliability and Service

Want to know which company is quickest at repairing broken PCs, or which has the lowest problem rate? This comprehensive listing in nine key reliability and service categories provides a detailed assessment of the performance of 19 top PC makers. Ratings are based on the responses of roughly 17,800 respondents to PC World's Reliability and Service Monitor between May 20 and November 20, 1995. Individual companies are listed according to their position in the overall rankings. Listings within categories (such as Best, Good, and so on) are alphabetical. In all cases, five stars is the best possible rating.

★★★★★ BEST									
Apple Excellent reliability backed by top-notch service. Gotta love them Macs.	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★	★★★★	★★★★
Compaq Top of the charts in all categories. Who could ask for anything more?	★★★★	★★★★★	★★★★★	★★★★★	★★★★	★★★★	★★★★★	★★★★★	★★★★★
Digital Stellar performance, if a little slow on the phones.	★★★★★	★★★★★	★★★★	★★★	★★★★	★★★★★	★★★★★	★★★★★	★★★★
Hewlett-Packard These PCs are built for the long haul.	★★★★★	★★★★★	★★★★★	★★★★	★★★★	★★★★	★★★★★	★★★★★	★★★★

★★★★ GOOD									
Dell High customer satisfaction, but troubling rate of unresolved problems.	★★★★	★★★★	★★★★	★★★★	★★★★	★★★	★★★★★	★★★★★	★★★★★
IBM Problem rate is inching the wrong way, but Big Blue is quick to set things right.	★★★	★★★★	★★★★★	★★★★	★★★★★	★★★★	★★★★	★★★★	★★★★
Micron High never-resolved rate mars otherwise solid scores.	★★★★★	★★★★★	★★★★	★★★★	★★★★	★★	★★★★★	★★★★	★★★★★
NEC Two danger areas: component DOA rate and phone response.	★★★★★	★★★★★	★	★★	★★★★	★★★★	★★★★	★★★★	★★★★

THE STAR SYSTEM
Stars correspond to companies' relative rankings generated from raw scores in individual categories. Following are the ranges of raw scores in each of the nine categories. In all cases, five stars indicate best performance.

PROBLEM RATE

The percentage of all respondents reporting one or more non–DOA hardware problems. Five stars: 34 to 37 percent. Four stars: 39 to 43 percent. Three stars: 47 percent. Two stars: 51 to 52 percent. One star: 53 to 58 percent.

SYSTEM DOA RATE

The percentage of all respondents who reported one or more of the following components DOA: hard drive, motherboard, CPU, or power supply. Five stars: 1.1 to 1.9 percent. Four stars: 2.2 to 2.5 percent. Three stars: 2.9 to 3.4 percent. Two stars: 4.0 to 4.5 percent. One star: 6.2 percent.

COMPONENT DOA RATE

The percentage of all respondents who reported one or more "non-system-level" components dead on arrival. Five stars: 4.1 to 5.1 percent. Four stars: 5.8 to 7.0 percent. Three stars: 7.8 percent. Two stars: 8.7 to 9.3 percent. One star: 10.3 to 15.0 percent.

TIME TO TALK

How long it took for respondents reporting problems to reach a support staffer who could help them. Five stars: 14 to 15 hours. Four stars: 17 to 22 hours. Three stars: 24 to 26 hours. Two stars: 31 to 36 hours. One star: 41 to 54 hours.

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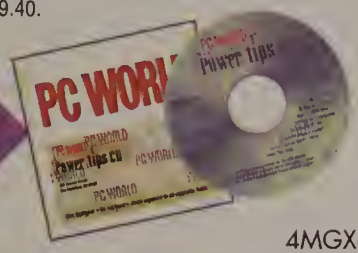

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Shoup. Although in the past he's been in charge of researching and purchasing PCs for his company, Shoup says buying one for home—with his own money—was a very different exercise. "When the hard disk crashes, it's your money paying for the replacement."

Digital didn't make a name for itself in the home market, but like Compaq, IBM, and most recently Hewlett-Packard, it has made significant investments in its consumer line of PCs. But such stalwarts of the corporate computing world are finding that competing in the consumer market presents a host of new challenges—profit margins are slimmer, and the support costs are huge.

A Whole New Ball Game

"In the business market, you prioritize calls based on how important the customer is," says Dona Rozhin, worldwide channel and support manager for Hewlett-Packard's Home Products Division. "In the consumer market, every customer is just as important as the next." So when the calls start flooding the technical support lines, as they did for many PC manufacturers right after the release of Windows 95, companies just have to plow through the queue—and consumers just have to wait.

FAIR									
Acer Lots of unresolved problems drag down satisfaction rating.	★★★	★★★	★★	★★★★★	★★★	★	★★★	★★★	★★
AST Average in most categories, but slow on the phone.	★★★★	★★★	★★★★	★★	★★★	★★★	★★★	★★★	★★
Compudyne Above-average service can't mask poor reliability.	★★	★★	★	★★★	★★★★★	★★★★★	★★	★★	★
Gateway 2000 High problem rate and spotty service.	★★	★★★★	★★★	★★	★★	★★★	★★★★	★★★	★★★
Leading Edge Same as Gateway.	★	★★★★	★★	★★	★★	★★★	★★★	★★★	★★

POOR									
Midwest Micro Poor reliability doesn't seem to hurt customer loyalty.	★	★	★	★★	★★	★★★★	★★★★	★★★	★★★★
Packard Bell Low component DOA rate, but customers still can't get no satisfaction.	★	★★★	★★★★	★	★★	★★	★★	★★	★
Pionex Lots of problems, and many never get resolved.	★	★★★★	★	★★★★	★★★★	★	★★★	★★★	★★
Quantex Poor reliability and so-so service, but customers still say they'll buy again.	★★	★★	★	★	★★	★★★	★★★★	★★★	★★★

WORST									
Comtrade The worst of both worlds: unreliable PCs and bad service.	★	★★	★	★	★★	★	★	★	★
Zeos A recipe for disaster: lots of problems and lousy service.	★★	★★	★★	★	★	★★	★★	★★	★★

TIME TO RESOLVE
How long it took the company to repair hardware problems reported by respondents. Five stars: 4 to 6¾ days. Four stars: 7 to 8 days. Three stars: 9 days. Two stars: 9¾ to 10 days. One star: 14 days.

UNRESOLVED PROBLEMS
The percentage of all respondents reporting that their problems were never resolved. Five stars: 0 to 3.1 percent. Four stars: 4.4 to 5.5 percent. Three stars: 5.8 to 8.1 percent. Two stars: 9.9 to 11.4 percent. One star: 13.0 to 13.9 percent.

BUY AGAIN BASED ON SERVICE AND SUPPORT
The percentage of all respondents reporting problems who would buy from the company again, based on service and support. Five stars: 83 to 87 percent. Four stars: 73 to 79 percent. Three stars: 63 to 70 percent. Two stars: 54 to 57 percent. One star: 46 percent.

LOW SATISFACTION
The percentage of all respondents reporting less than average satisfaction with service and support. Five stars: 12 to 15 percent. Four stars: 19 to 22 percent. Three stars: 24 to 34 percent. Two stars: 34 to 38 percent. One star: 56 percent.

HIGH SATISFACTION
The percentage of all respondents reporting better than average satisfaction. Five stars: 59 to 63 percent. Four stars: 53 to 56 percent. Three stars: 45 to 50 percent. Two stars: 35 to 38 percent. One star: 31 to 33 percent.

MOST LIKELY TO...

...know the answer		...steer you wrong	
Company	**Rating**	**Company**	**Rating**
Apple	4.1	Comtrade	3.0
Dell	3.9	Leading Edge	3.3
IBM	3.9	Zeos	3.3

Average knowledge rating for all companies: 3.6

Ratings are on a scale of 1 to 5, with 1 being low.
Source: Based on ratings of technical support personnel for knowledge in PC World's Reliability and Service Monitor, May 20 through November 20, 1995.

Esther Miller, a marketing manager for a garment manufacturer in Manhattan, found herself at the end of a long phone queue when she called Micron last September about video problems on her home PC. "Things started out fine, but now it's a horror," says Miller. "I used to get through to tech support in ten minutes; but since the launch of Windows 95, you can't get through in less than a hour." Miller's frustration is compounded by the fact that she hasn't even upgraded to the new operating system. "I'm waiting until all the bugs have been identified and fixed," she notes wryly.

Just about every PC company got a spike in calls in late August and September, but judging by responses to *PC World*'s questionnaire, Micron was one of the hardest hit. Though the firm still answers the phone and corrects problems quicker than many of its competitors, its service suffered dramatic setbacks during the late summer and early fall. In June, July, and August, respondents reported that it took roughly 16 hours to speak to the person who ultimately helped them with their problem. In contrast, respondents who received service in September, October, and November reported it took on average just over one day to speak to the person who was able to help them.

Pete Scamardo, Micron's vice president of marketing, says the company was buffeted by the release of Windows 95 because a very large percentage of its customers wanted to upgrade right away—more so, perhaps, than those companies whose customers are less-experienced PC users. And until mid-November, Micron's technical

When On-Site Service Isn't On Site

When you buy a new PC, you get on-site service, right? Maybe not. The option might be standard in most warranties, but many companies discourage its use.

Just ask Paul Bunone. He bought his first home computer last April and was sold on the idea of on-site service. He figured that if something broke, he'd just call the support line and let the experts take it from there. But Bunone, an insurance underwriter in Hasbrouck Heights, New Jersey, soon discovered that the reality of on-site service falls far short of the promise.

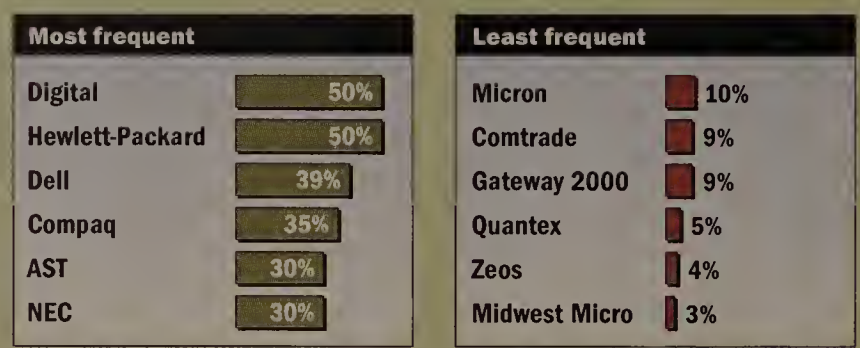
When Bunone's months-old Quantex started "acting weird"—the cursor moved erratically and pages didn't print right—he called the company and asked to have someone come to his home to correct the problems. "They said, 'we aren't at that point yet,'" he recalls. What they meant was that Bunone, rather than one of Quantex's repair people, would be the first line of defense. Instead of dispatching someone to diagnose and repair the problem, Quantex sent Bunone a new graphics board for him to install himself. The directions were clear, says Bunone, and he was able to swap the boards out easily. But, he adds, "never in my wildest dreams did I think I would be mailing parts back and forth."

Everyone Offers It, But...

Bunone is in good company. Of the 212 Quantex owners who responded to *PC World*'s Reliability and Service Monitor indicating their PCs needed service, roughly 47 percent said they resolved a hardware problem by swapping components. That compares to only 5 percent who said a technician visited them. And Quantex isn't the least likely to use on-site service (see chart). That dubious honor goes to Midwest Micro, a small mail-order firm; only 3 percent of the Midwest Micro PC owners who told us about their service experience said they received on-site service. At the other end of the spectrum, owners of Digital and Hewlett-Packard PCs reported the highest use of on-site service. Half of the respondents who needed service had a technician come to their home or office to fix their PCs.

Judging from responses to our Reliability and Service Monitor, your chances of being able to take advantage of on-site repair services depend a lot on where you buy your PC. On average, only 12 percent of respondents who bought from a mail-order company reported using on-site service. That compares to an average of 21 percent among all respondents. But some mail-order vendors use on-site service more aggressively. About 39 percent of

ON-SITE SERVICE? DON'T COUNT ON IT



Percentage of requests for service that resulted in on-site service.

Source: PC World Reliability and Service Monitor, May 20 to November 20, 1995. Data includes only companies about which we received 100 or more responses.

support lines shut down in the evenings and on the weekends, compounding the problem. In the consumer market, all the problems occur "between midnight and 2 a.m.," says Scamardo, only half-joking.

PETER GREGOIRE

It's the Hardware! No, It's the Software!

Corporate PC users have to deal with their share of problems, but the issues are often more complex and more difficult to troubleshoot for home users, say PC company executives. And providing tech support gets more complicated every day, as new printers, CD-ROM drives, and other peripherals are introduced. Complicating matters even further: Home users are generally on their own—so even a relatively simple problem can cause a lot of frustration and difficulties if it's not quickly and correctly diagnosed.

Michael Culver, vice president and general manager of Acer's Consumer Products Division, cites a costly example from last year, when some Acer models wouldn't run Microsoft Encarta. "We shipped out thousands of CD-ROM replacement drives to customers, thinking it was a problem with the hardware," recalls Culver. In the end, the culprit was a driver shipped with the Encarta CD-ROM itself. "It was a big problem."

Of course, successful companies must be able to anticipate any problems that will arise, whether they originate in hardware or software. This is especially true for companies in the consumer market, since home users don't particularly care what causes a problem; they just want it resolved.

Windows 95 should make things easier for consumers and PC makers alike, but both

Never in my wildest dreams did I think I would be mailing parts back and forth. —Paul Bunone, Hasbrouck Heights, New Jersey

all Dell respondents who reported needing service took advantage of the on-site option. Interestingly, of the 19 Compaq owners who needed service and reported buying their PC through a mail-order business, 10 said they used on-site service—so Compaq does not seem to differentiate based on where a PC is purchased.

Two factors may weigh heavily into how often a company uses on-site service: the cost of its PCs, and the percentage of its customers in businesses rather than homes. In many cases, respondents who owned higher-priced PCs (which typically have a large corporate base) were also the ones reporting a higher incidence of on-site service. So, the trade-off consumers may need to consider is what they value more: saving money up front, or getting on-site service down the line.

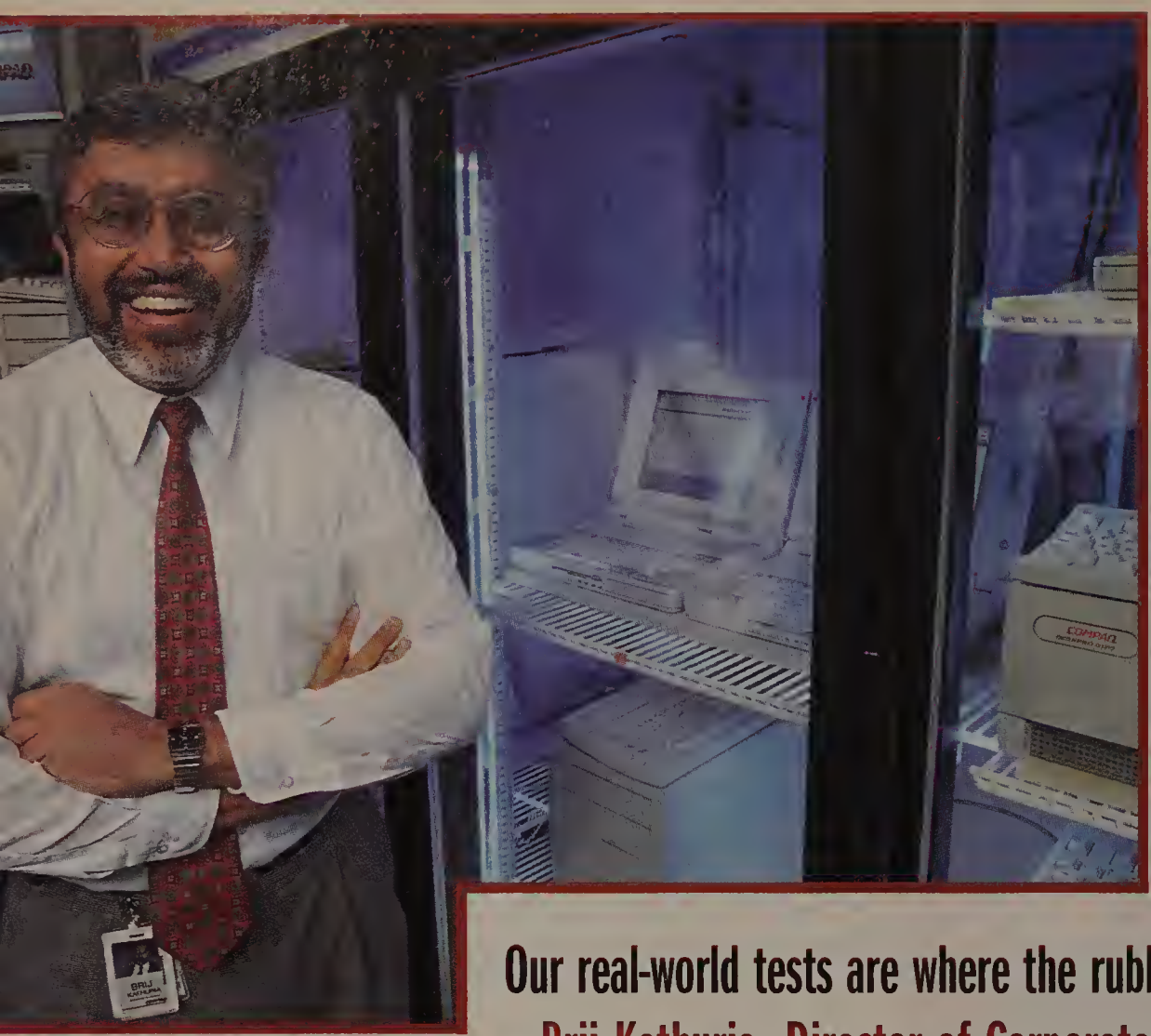
Mice, Yes; Hard Drives, No Way

Many of the companies pushing their consumer lines rely heavily on on-site service. Acer, Compaq, and Hewlett-Packard each designate only a few parts that they consider user-installable, such as mice, keyboards, speakers, and monitors. (Compaq even hedges on monitors, since their weight and size make shipments expensive.) These constraints reflect the large number of customers who are buying PCs for the first time and may not feel comfortable swapping parts in and out of their PCs, says Dona Rozhin, worldwide channel and support manager for Hewlett-Packard's Home Products Division.

In contrast, a company like Micron, which has an experienced customer base, relies heavily on component swaps to resolve hardware problems. Roughly 10 percent of Micron owners who needed service reported using an on-site technician, compared to 44 percent who swapped parts. "It's handled on a case-by-case basis by our technical support department," says Pete Scamardo, Micron's vice president of marketing. "Sometimes it's quicker just to ship the part to the customer."

For example, Esther Miller, a marketing manager for a small clothing manufacturer in Manhattan, didn't have time to wait around for a repair technician when her Micron computer went on the fritz. "I take care of our three computers where I work," says Miller. "I don't mind swapping parts in and out. Besides, with my schedule it would have been impossible to hook up with a repairperson."

Recognizing the difficulty many home PC owners have trying to juggle work schedules with on-site repair visits, a few companies are beginning to schedule weekend appointments. Acer is offering free repair service on Saturdays for all PCs still under on-site warranty; Hewlett-Packard is also offering Saturday service, though you'll pay $49 for the privilege. No doubt other companies will quickly follow to stay competitive.



problem resolved. Average hold times ranged from as short as 6 minutes (Digital) to as long as 14 minutes (Packard Bell). But the first person that consumers reach when they call a PC company's technical support line is rarely the one who helps them with their problem; on average, it took consumers just over one day (28 hours) to speak to the technician who ultimately helped them set things right. Among the companies included in this report, Zeos was the slowest at putting people in touch with the right person—customers reported an average wait of more than two days before getting the help they needed.

The overwhelming majority of survey respondents said their problem was ultimately resolved to their satisfaction—even if it wound up taking longer than they would have liked. But 8 percent said their problem was never resolved at all.

Our real-world tests are where the rubber meets the road.
—Brij Kathuria, Director of Corporate Operations Quality, Compaq

groups have not yet seen its benefits. With the rise in new computer purchases just after the introduction of the new operating system, and the compatibility snafus faced by PC owners looking to upgrade, tech support calls have skyrocketed.

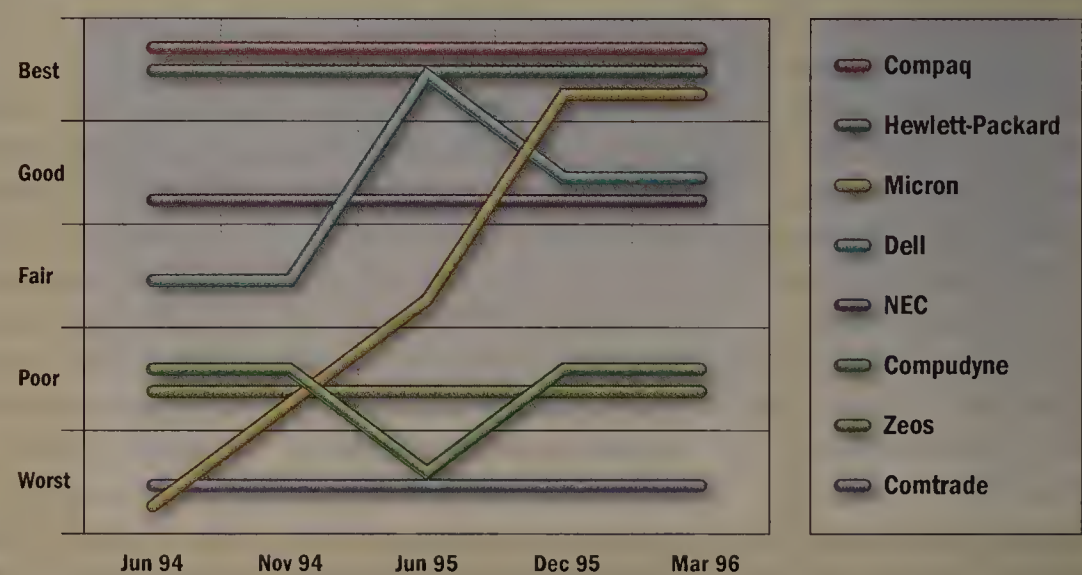
Culver says the Encarta incident is typical of the headaches that home PC owners face, noting that more problems are related to software than to hardware. But respondents to *PC World*'s survey tell a different story. A full 70 percent of the respondents with a non-DOA problem said it was hardware related, compared to 59 percent who said software was the culprit. Faulty hard drives accounted for 15 percent of all reported component failures, followed by monitors (13 percent), motherboards (12 percent), and video cards (10 percent); other components failed in smaller numbers. Pentium owners experienced more DOAs (12 percent versus 11 percent), and the CPU itself was nearly twice as likely to fail, according to respondents who reported a component failure (6.2 for Pentium owners, compared with 3.5 for those who own 486 machines). This higher rate is not surprising, given the debacle last year over flaws in the Pentium chip.

Among respondents needing assistance, telephone technical support was by far the most heavily used service option: 71 percent dialed the phone in hopes of getting their

The biggest offenders: Acer and Comtrade, each with a 14 percent never-resolved rate; Pionex, 13 percent; Packard Bell, 11 percent; and Micron, 10 percent.

PC Reliability: The Long View

A historical look at the overall reliability rankings of several leading PC companies proves the old adage: The more things change, the more they stay the same.



Source: Responses to PC World's Reliability and Service Monitor.

JIM CALDWELL

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Company	**Rating**	**Company**	**Rating**
Apple	3.7	Compudyne	2.6
Dell	3.6	Comtrade	2.6
Hewlett-Packard	3.6	Zeos	2.6

Average follow-up rating for all companies: 3.2

Ratings are on a scale of 1 to 5, with 1 being low.
Source: Based on ratings of technical support personnel for follow-up in PC World's Reliability and Service Monitor, May 20 through November 20, 1995.

The Call You Never Have to Make

Few consumers—or PC companies, for that matter—would disagree that the dream PC is one that requires no support at all. Clearly, no PC maker has managed to achieve that ideal, but Compaq has come closer than just about any company.

Compaq PCs have proved to be among the most trouble-free in every *PC World* report on reliability and service, and it's no accident. The company has perhaps the most sophisticated procedures in the industry for evaluating PC quality and reliability—from its environmental lab in which new components are put through torture tests before they're cleared for assembly, to the robot-equipped reliability lab that tests product designs to ensure they will function consistently over the long haul.

But the tests that Brij Kathuria, Compaq's director of corporate operations quality, is most proud of occur in a small corner of the company's distribution facility. They're what he calls "real-world tests." Every day, a sample of finished products is diverted from the goods going to distribution and instead put through one last series of tests by Kathuria's group.

The first thing the real-world testers do is open each box and check to make sure the PC is complete and that everything's working properly. Then they install every available Compaq option, to make sure there are no compatibility problems. Finally, they hook the machines up to a network. Sometimes they even put the computers in a large deli freezer to see how well they perform in extreme cold. "It's where the rubber meets the road," says Kathuria.

But some new Compaq PCs won't benefit from this final—and some might say critical—test. For the first time in its history, Compaq has contracted with an outside firm to manufacture some of its desktop computers. The new Presario 7100 line, introduced last fall, is being manufactured by Mitac, a computer company based in Fremont, California. Compaq has a team of people overseeing the relationship and making regular visits between the Fremont facility and its Houston headquarters to ensure that the 7100 line meets Compaq's quality standards. Only time—and Presario 7100 owners—will tell whether Compaq has achieved its goal.

You Can Fool Me Once...

Perhaps the ultimate test of customer satisfaction is whether a consumer would choose to do business with the same company again. When *PC World* asked people with problems to answer that question based on the service they received, only 70 percent said they would buy again. And for almost half of the companies in this report, the buy-again rate drops even lower.

For many consumers, it comes down to expectation versus reality. Miller, for example, had heard great things about Micron, so she expected the best service possible. The reality fell short, and she doubts she'll buy another Micron PC. Paul Bunone, from Hasbrouck Heights, New Jersey, had the same reaction after encountering problems getting his Quantex PC serviced. He, too, plans to buy from a different company when it comes time to upgrade his PC.

"We all need to do a better job of setting consumers' expectations," says Acer's King, noting that all too often consumers' disappointments could be avoided with more education efforts, either by the retailers who sell the products or by the PC makers themselves. With more and more PCs being bought by consumers who are upgrading from an existing computer rather than buying their first PC, the ability to set—and meet—expectations may well be the difference between continuing to ride the home computing wave and wiping out big time.

Roberta Furger is Senior Writer for PC World. *Associate Editor Aoife McEvoy contributed to this article.*

A Word About the Numbers

The Reliability and Service Monitor is a monthly fax questionnaire bound into every issue of PC World. The rankings and scores presented in this article were generated from the results of approximately 17,800 questionnaires returned to PC World between May 20 and November 20, 1995.

Because the Reliability and Service Monitor is not a random-sample questionnaire, its results are not statistically projectable either to the larger base of PC World readers or to PC owners in general. However, because the Reliability and Service Monitor is not inherently biased in favor of any particular brand, it does provide valuable insight into the relative differences among companies reported on in this article.

We limit our reporting to companies about whom we have received at least 100 usable questionnaires. We also limit our discussion to PCs that were purchased after November 1993, to focus our analysis on new systems and service experiences.

SCORES AND RANKINGS

To determine the reliability ranking for each company, we measured three categories: percentage of respondents who had a problem, 50 percent weighting; percentage with a system-level DOA (that is, with PCs that had a faulty motherboard, CPU, hard drive, or power supply right out of the box), 30 percent; and percentage reporting one or more other components DOA, 20 percent.

To determine the service rankings, only respondents reporting on their service experience were counted. We measured six categories: average time it took respondents to talk to the person who could help them, 10 percent weighting; average time it took to resolve the problem, 20 percent; percentage reporting that their problem was never resolved, 30 percent; percentage who would buy the same brand again based on service, 20 percent; percentage reporting low satisfaction with service, 10 percent; and percentage reporting high satisfaction with service, 10 percent.

For each of the service and reliability categories, we ranked companies on a scale of 1 to 5 to determine star ratings. We determined a company's overall ranking based on the sum of its reliability and service scores, as well as the number of stars awarded in individual categories.

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This is a true story.

I was working away in my home office late one night, and just as I was about to sew up my big deadline project, ear-splitting music started blasting from my next-door neighbor's condo. Thunderous waves of Pearl Jam flooded my canals. I clearly was not going to finish my work with this audio assault, so I called my neighbor.

"Hey, would you *please* turn down your stereo? I can't think in here," I screeched in as polite a tone as I could muster.

"I don't have the stereo on," the guy told me in a tone suggesting I was crazy.

"Then where is that music coming from?"

"Oh, that's my *PC* playing," he replied nonchalantly.

In case you haven't noticed, the personal computer—that bone-colored box you spend umpteen hours on every day crunching numbers and answering e-mail—has blossomed into a major stereo system in its own right. High-powered performance from sound cards, built-in audio chips, and stereo speakers now rivals sound from components in an audiophile's living room. Sophisticated MIDI keyboards are now capable of inspiring a budding Billy Joel.

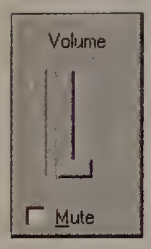
At the same time, software programs that let you tap into your PC's musical talents—as well as your

by James A. Martin

MATSU

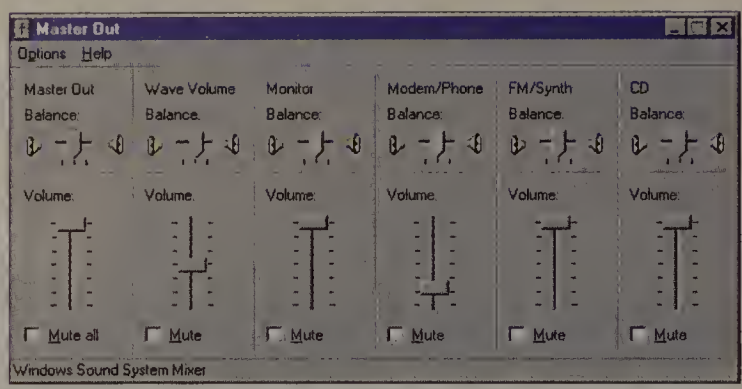
own—have noticeably matured. Which sound program strikes the right chord for you: a utility to manage music and sound files? Or a program that will land you on *Billboard*'s Top 40? This question-and-answer guide will steer you to the right package for work or play.

Q: *There are so many ways to control sound volume on my PC using hardware and software—particularly with Windows 95. Which one do I use when? How do I make sure one volume control doesn't conflict with another?*



A: **1.** The easiest, fastest way to adjust the volume of an audio CD is with the dial on the front panel of your CD-ROM drive. The dial affects only the playback volume of an audio disc, however, and some of the newer multimedia PCs (such as Hewlett-Packard's Pavilion series) have dropped the dial altogether.

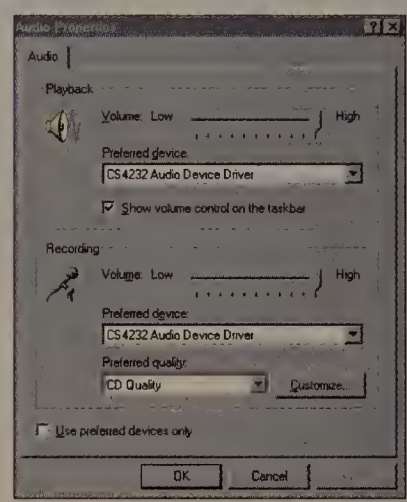
2. The Windows 95 Taskbar, located at the bottom of the screen, contains a speaker icon. Click it once to get a simple master volume control, shown above left. Using this lever, you can turn the volume up or down or mute it entirely (once muted, a red circle/slash appears over the speaker icon as a reminder). This thermometer-like lever determines the volume of *all* sounds on your PC, whether they are .wav, MIDI, or CD audio. To test the volume level, click on the lever button to hear a system sound.



Double-click the desktop speaker icon for this control menu.

3. Double-click the speaker icon to pop up the Windows 95 Volume Control utility (above), which includes the master output control as well as individual levers for .wav files, monitor, microphone, FM/synthesizer, and CD audio.

Many sound cards include their own mixer utility. In that case, your Windows 95 system will have two mixers; a utility such as Voyetra's AudioStation adds yet a third. All these utilities work independently unless they have been made Windows 95 compliant. In that case; the mixer utility writes to the Windows 95 MS Mix Manager DLL in order to share its volume and control settings and vice versa; changes made to one mixer are reflected in the other. If they are not Windows 95 compliant, you will need to be ever vigilant in maintaining volume levels for each utility so that one does not cancel out another. For example, one utility could be set to a low volume while the Windows 95 speaker icon is set to maximum. If you look at just the Windows 95 speaker icon, you might assume something is wrong with your sound system when the only problem is that one of the sound utilities is muffling full volume.



Right-click the desktop speaker icon for the Properties panel.

4. In Windows 95, right-clicking the speaker icon

Online Jukebox: Music by Modem

Cruising for some tasty sound bites on the Internet? Cool sound utilities? Hot music info? Here's a selective playlist of music-related Web sites and online service areas.

• A good place to start your Web crawling is Yahoo's Music directory (http://www.yahoo.com/Entertainment/Music/). Yahoo, that wacky but efficient Web index, has compiled hundreds of hyperlinks to music-related Web sites—record labels with sound-clip samples of the latest releases, and genre-specific sites for virtually every type of music from ancient to zydeco. Check out Yahoo's music software link (http://www.yahoo.com/Entertainment/Music/Genres/Computer_Generated/Music_Software/) for downloadable shareware and utilities.

• Small and large record labels have flocked to the World Wide Web, and their sites are brimming with downloadable multimedia files, sample music clips from new albums, discographies of artists, videos, and oceans of musical trivia. Some of the best sites are:

Sony Music: http://www.sony.com/Music/MusicIndex.html
MCA : http://www.mca.com/mca_records
PolyGram: http://www.polygram.com/polygram/Music.html
Warner Brothers: http://www.wbr.com
Elektra: http://www.elektra.com
Motown: http://www.musicbase.co.uk/music/motown
EMI: http://www.rockonline.com/emi
Rykodisc/Hannibal: http://www.rykodisc.com

• At the Voyager Co.'s Web site (http://www.voyagerco.com/cdlink/cdlink.html), you can download CDLink, a free Web browser utility that links online content to your PC's CD-ROM drive. An essay posted on the Web regarding Thelonious Monk's *Brilliant Corners* album, for example, triggers playbacks of the cited passages from the audio CD, as long as you have this CD album in your PC's CD-ROM drive. There is also supplemental track-by-track analysis of selected CDs not found on each of the album's liner notes. The Voyager site maintains a list of all CDLink Web sites as well.

• The Music Kitchen (http://www.nando.net:80

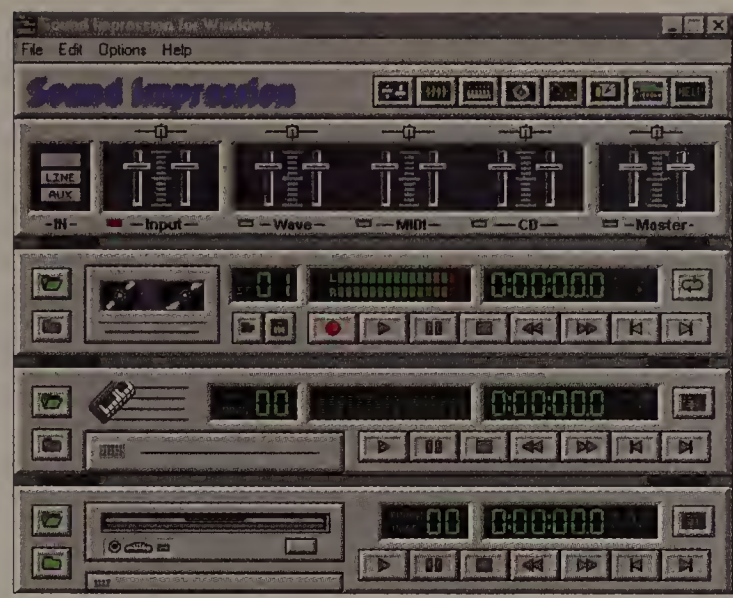
opens a pop-up menu with two choices: Volume Controls, which takes you to the Windows 95 master mixing panel, and Adjust Audio Properties, which opens the Audio Properties dialog box.

The sliders in the Adjust Audio Properties box control the volume for your PC's internal speaker as well as for any attached recording device. You'd use the Adjust Audio Properties only to tweak the volume of your system (.wav) sounds, such as the Windows 95 start-up chime; the volume level you set here does not affect CD audio, MIDI, and other sounds controlled by the Windows 95 Volume Control mixing panel.

5. Of course, all this advice assumes the volume level of your speakers is turned up.

Q: *When I put an audio CD into my CD-ROM drive, Windows 95 automatically starts up CD Player. What if I don't want it to start automatically?*

A: There are two options to deactivate Autorun. The easiest way is to simply hold down <Shift> when you close the CD-ROM drawer. If you never want Autorun active, open any desktop folder and select *Options* from the *View* drop-down menu. Select *File Types*; from the list of Registered File types, choose *AudioCD;* and click *Edit.* Click once on *Play* from the Action list box. Then click *Set Default*—this toggles the Autorun default. If Play is in boldface, the CD plays when inserted. If it is not bold, the CD does not play.



Sound Impressions offers an audio component rack interface to let you customize your sounds.

Q: *I have a jazz CD that features the Pearl Bailey song "Tired." In the middle of that song, Pearlie Mae confides to the listener: "I guess y'all got the general impression by now: I am tired, honey." I'd love to capture that particular phrase and use it as my Windows shutdown sound. Is there a program that will let me do that?*

A: Two packages handle this task. The more full-featured one, however, works only with SCSI CD-ROM drives. (Alas, in prepackaged multimedia PCs, IDE drives are much more common than are the more expensive SCSI CD-ROM drives.) Optical Media International's SCSI-only Disc-To-Disk lets you capture, for example, your favorite passages from a CD recording. You could follow Bill Gates's lead and copy the refrain "Start Me Up" from the Rolling Stones song, save it as a .wav file, and assign it as your Windows 95 start-up sound. And, of course, you can capture Pearlie Mae's weary lament as well.

Copying sound in Disc-To-Disk is a mostly straightforward process: Load the CD, launch the program, select the track, and go for it. Once you capture the audio, you can save it in .wav, Creative Labs VOC, QuickTime, and Macintosh sound formats. You can save the sound in full CD quality (16 bits, 44.1 kHz) or sample it to 8-bit mono to save disk space.

Another program, Sound Impression, handles CD audio capture (as .wav files) from IDE or SCSI CD-ROM drives. Sound Impression has been around a few years, though, and supports only about two dozen sound cards. As a result, those with new multimedia systems or sound cards might not be able to take advantage of this function. Midisoft is working on an update for Sound Impression, but no release date was available at press time.

In any event, keep in mind that when you duplicate audio from a CD, you're creating a derivative work of copyrighted material. No one's going to drag you to court for playing a song clip on your own PC, but using copyrighted music without permission as part of a public presentation is another matter.

- **Disc-To-Disk**
$99; Optical Media Int'l; 800/347-2664
Reader service no. 691
- **Sound Impression**
street price $35; Midisoft; 800/776-6434
Reader service no. 692

Q: *I'm terribly disorganized. In fact, my office could be condemned by the Environmental Protection Agency. One of the things I want to do to clean up my act is get all my multimedia files—MIDI, .wav, .avi video, bit-mapped graphics, and so on—organized in one place. Any advice?*

A: Media Commander 2.0 is a handy database that allows you to organize a multitude of files into easily searchable graphical catalogs. In one catalog, for instance, you can include thumbnail representations of sound files (in MIDI, .snd, .voc, and .wav formats); animation and video clips (.avi, .flc, .fli, MMGIF, and QuickTime for Windows); bit-mapped and vector graphics;

/music/gm) is a good place to start exploring Web sites for such currently hot performers as the Beastie Boys, Bonnie Raitt, Rock-It Comix, the Meat Puppets, and others. There you will find sample tracks you can listen to online, video clips for instant playback, tour information, biographical information, and fan trivia.

- **Whether you like the theme to *I Love Lucy* or *The Twilight Zone*, *Seinfeld* or *Baywatch*, you can find it in .wav or Real Audio format at http://themes.parkhere.com/themes. A vast library of sound bites from old and new television shows is available here for downloading.**
- **The online services offer libraries chock-full of sound clips and utilities for free downloading. On America Online, go to the PC Music and Sound Forum (keyword pc music). At CompuServe, try the MIDI/Music Forum (go midi).**
- **Hungry for more? Get a copy of NetMusic ($19, Random House, 1995, 800/726-0600), a compendium to thousands of music sites.**

Reader service no. 690

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and even text documents.

You can sort files in a catalog by keyword, compression method, original file size, and other criteria, and drag and drop the files into other applications as well as record voice notes and attach them to any of the files.

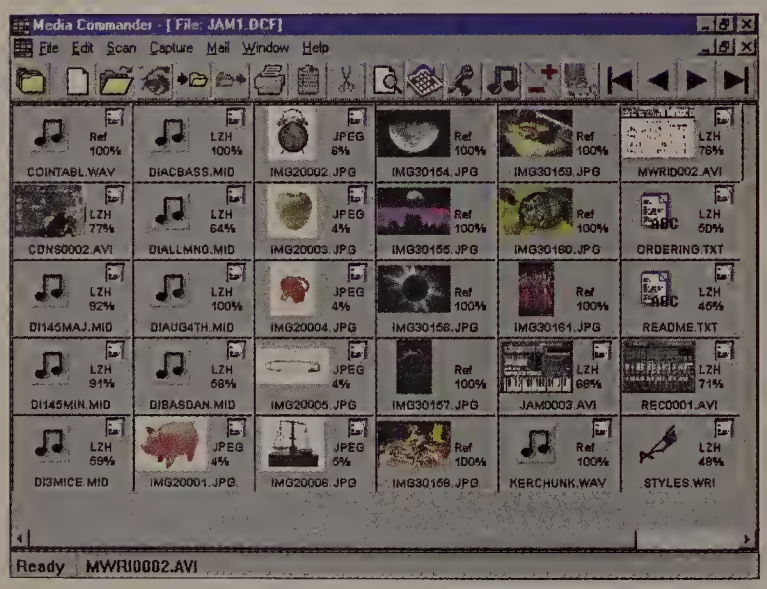
A similar but cheaper program, JASC Media Center, offers many of the same features as Media Commander, plus the ability to display catalog files in a slide show. But Media Center doesn't import as many file formats as Media Commander, and its interface and tools aren't as easy to use.

- **JASC Media Center** *$39; JASC, Inc.; 800/622-2793, 612/930-9171*

Reader service no. 693

- **Media Commander 2.0** *street price $89.95; DataCal; 800/223-0123*

Reader service no. 694



Media Commander's unique multimedia file thumbnails are convenient for organizing all your sounds.

Q: *Windows 95 gives me some basic sound control and mixing capabilities. But I want absolute, total control, right now. What programs should I consider for playing and editing MIDI, .wav, and CD audio files?*

A: Dozens of solid shareware sound manipulation programs are available online for downloading. The SuperSonic Sound System, for example, features a mixer, CD player, sample player, sample editor, real-time 16-band spectrum analyzer, wave analyzer (oscilloscope) and more—all in a rack-mount interface complete with buttons and sliders like the ones professional recording studios sport. It is one of a legion of similar packages you can find in America Online's Software Center. Click the *Music and Sound* search option to get a choice listing.

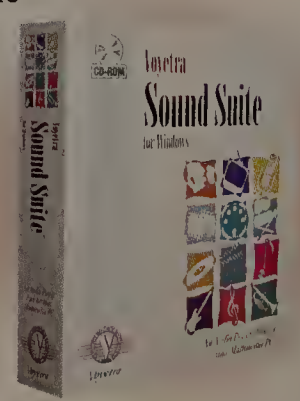
Commercially, your best bet is Voyetra Technologies' $199.95 Sound Suite for Windows, a power package of audio utilities. Among Sound Suite's goodies is AudioStation, a mixing panel that resembles a home stereo component rack. AudioStation lets you build playlists of selected MIDI and .wav files and CD audio tracks, choose volume settings for each file type, and even play three types of audio at once. AudioStation works in sync with the Windows 95 volume control; changes made in one utility are conveniently reflected in the other.

Playing audio files is only *part* of Sound Suite, though. The package also includes several useful features: AudioView displays .wav files graphically for tighter, more controlled editing; Say It records audio notes to application files (such as word processing documents); VoiceNet lets you send voice-annotated e-mail over Novell networks; ImageStation and VideoStation view and organize graphic and video files, respectively; and SoundScript creates multimedia presentations. You also get MIDI Orchestrator Plus, a modest MIDI sequencer with notation; and Music Gallery, which has some 400 MIDI files for you to tinker with.

Midisoft's Sound Impression features many of the functions offered in AudioStation and also employs a home stereo component rack interface. Its .wav editor has a few more tools and capabilities than AudioStation's, but accessing them via its array of small icons can be confusing, especially since no bubble help or status bar helps you figure out what's what.

- **Sound Suite for Windows** $199.95; *Voyetra Technologies; 800/233-9377*

Reader service no. 695



Q: *I couldn't care less about discovering my inner child, but I would get a kick out of locating my inner Cole Porter. Do any software applications help the musically challenged tap out a few tunes on their PCs?*

A: There's a veritable crescendo of software designed to let novices cut, paste, and mouse-click their way to music composition. Keep in mind that while these programs are relatively easy to use, you'll need to spend some time getting familiar with them. You'll often encounter lots of confusing icons, among other things. You're not likely to generate rich, professional-sounding pieces with these programs, either.

One of the most entertaining packages is Blue Ribbon's Melody Maestro 2.0, which lets you compose a MIDI tune by clicking a few icons and singing into a microphone (the software ships with a LabTec mike).

When you're creating a tune, Melody Maestro lets you choose from a number of musical styles—from the conventional to the unexpected, such as "Alien Country" (perfect for those Elvis UFO sightings), "Disco Queen" (enough said), and "7 a.m. Illusion" (great for early-morning business presentations). You can also assign your composition a Personality (such as "bittersweet" or "honest") and a Groove (the tempo). Then, pick up the microphone, pop a lung, and the software translates your show-stopping tones into MIDI chords (you can also use a MIDI keyboard as your input device, but it's not as much fun). When you're done, you can save the file, generate a score (in the Notation Station utility), and print it. Melody Maestro won't put you on the path to a Grammy, but it should help you whip up a custom MIDI tune within minutes.

Blue Ribbon's SuperJam 2.0, which is based on the same AudioActive technology as Melody Maestro, includes that program's quirky musical styles and personalities (plus a few more) and lets you generate music scores for printing. But SuperJam offers more editing and mixing controls than Melody Maestro, and its Eas-O-Matic MusicMaker feature lets you play chords directly from your computer's keyboard. Although SuperJam suffers from the same icon overload as many of these programs, the

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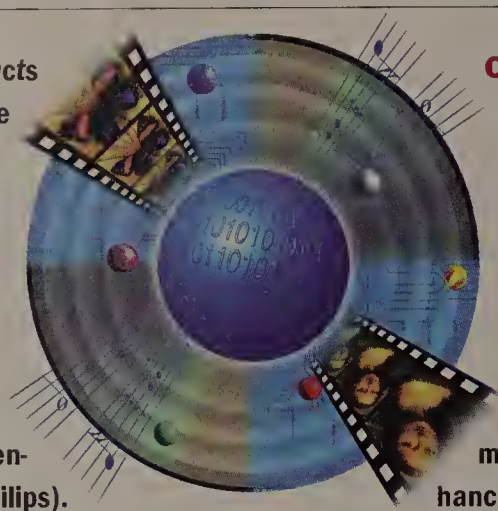
Music Meets the Multimedia PC

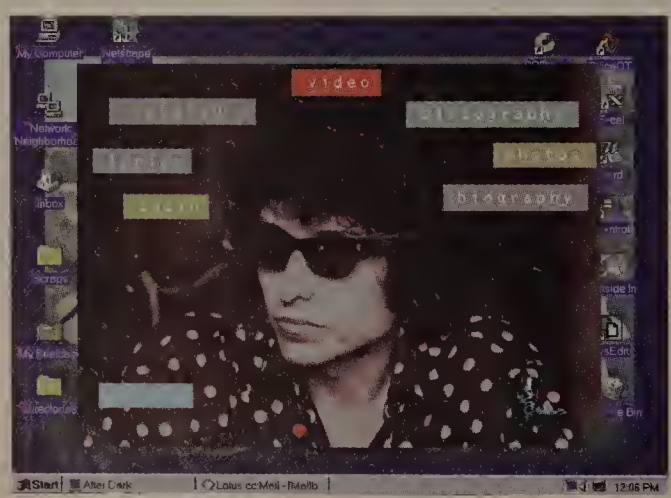


Q: *I'm starting to see products called enhanced CDs in the record store. Are they compact discs or CD-ROMs?*

A: Actually, they're both. Enhanced CDs are really a cross between audio compact discs and multimedia CD-ROMs; they're also called CD Plus (the trademark for enhanced CDs from Sony and Philips). You can play the music tracks on these discs on a traditional home CD player or on your multimedia PC's CD-ROM drive. But an enhanced CD also contains some level of multimedia content—a video performance of the band or the full text of the album's lyrics, for example—accessible only from a CD-ROM drive.

Q: *Give some examples of enhanced CDs.*

A: *Bob Dylan's Greatest Hits Vol. 3* ($22.98, Sony) adds lyrics, biographical and discographical notes, and two videos to the music tracks. The Cranberries' *Doors and Windows* (about $20; Island Records/Philips Multimedia) includes previously unreleased Woodstock '94 footage of the band. Other artists with enhanced CDs now available or in the works: Mariah Carey, Michael Jackson, B.B. King, Willie Nelson, Queensryche, the Rolling Stones, Soundgarden, and James Taylor.



Bob Dylan's enhanced CD goes behind his music.

- Island Records/Philips Multimedia Music *800/340-7888*

Reader service no. 698

- Sony Music *212/833-6564*

Reader service no. 699

Q: *Sounds good. What's the catch?*

A: Just because you have a multimedia computer doesn't mean that an enhanced CD will play on your system.

There have been numerous formats for enhanced CDs so far, but *CD Plus* is emerging as the standard because it places the computer data *after* the CD's music tracks. Another format, *track 1*, places the data on the CD's first track, before the music. Playing track 1's data track on an audio player produces high-pitched noise. If your volume happens to be turned up, it is possible to damage your speakers. This forces users to remember to skip to track 2 to begin hearing music—or else.

While CD Plus eliminates that problem, it creates others. Those who still have single-session CD-ROM drives (the standard before 1993) are out of luck; CD Plus requires a multisession drive. Also, CD-ROM drives from NEC and Toshiba include firmware that prevents the drives from locating the multimedia content on a CD Plus disc. The companies are updating their firmware to correct the problem, but that's little solace to those who already own these drives.

Enhanced CDs also require special CD-ROM drivers to play on a PC. Windows 95 already includes the necessary drivers for most CD-ROM drives. When it detects an enhanced CD format disc in a CD-ROM drive, it brings up a window with user-selectable choices: Play the music tracks, or install or start the multimedia program. If you're using Windows 3.1, though, you'll have to contact the manufacturer of your CD-ROM drive (or your multimedia PC) to get the driver you need (if such a driver has been developed). Corel Corporation has created a CD-ROM of drivers for enhanced CD that will be bundled with most CD Plus titles, which should help matters.

status bar at the bottom of the screen helps you figure them out, and the unintimidating manual is easy to follow.

- **Melody Maestro 2.0** *$49.95*, **SuperJam 2.0** *$99.95; Blue Ribbon SoundWorks, Ltd.; 800/226-0212*

Reader service no. 696

Q: *Excuse me, but there are people in the world who know the difference between an arpeggio and an archipelago. What software programs are available that skip the Music for Dummies shtick and offer more robust features and functions?*

A: If you have some understanding of music but have no need for professional musicians' tools, give Midisoft's Studio 4.0 a try. Studio 4.0 offers a creative environment for recording, editing, and arranging MIDI and .wav tracks. While the program is easy to use, it also gives you plenty of editing control: You can adjust the musical qualities of every note, overdub new tracks on top of existing ones, experiment with thousands of MIDI files, add lyrics that are synchronized to the music, mix .wav and MIDI tracks, and create special sound effects with the .wav editor.

The Windows 95–compliant Studio 4.0 lets you record multiple .wav tracks (the Windows 3.1 version supports only a single track of waveform audio). For example, you can record vocals, sound effects, and acoustic instruments from a microphone as .wav files, then place them anywhere on the waveform tracks for synchronized playback with MIDI tracks. (Studio 4.0 contains a 16-bit version of the program for Windows 3.1 users as well.)

All told, novices and know-it-alls alike should be able to come up with some effective music to work into that next presentation. Or you could always do as I did and score some choice notes to show your noisy neighbors that *your* PC has gone stereo, too.

- **Studio 4.0** *street price $110; Midisoft; 800/776-6434*

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James A. Martin is a PC World *contributing editor.*

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Sounds Good

A buyer's guide to state-of-the-art PC audio equipment

by Michael S. Lasky

Computer speakers are the Cinderella components of the multimedia age. At first they were overlooked and treated poorly—no one cared when they sounded flat and tinny. But now they're the belle of the ball as multimedia struts its stuff with sophisticated 32-voice, 16-bit sound cards and CD-ROM drives that double as audio CD players.

Actually, there is little difference between the speakers made for audio components and those designed specifically for multimedia computers. All speakers employ magnets as part of their design. Because hard and floppy disks are magnetic media, the magnets in nearby speakers can cause data loss on disks. Accordingly, speakers made expressly for multimedia PCs have magnetic shielding built into their cases to eliminate possible data damage or, for that matter, interference of computer monitor images.

If you can keep speakers at least a foot from your computer system, you can use any kind you want—not just computer speakers. When circumstances require more private listening—as in office cubicles—headphones are best. And because they are generally used at a safe distance from computers, any headphone on the market is appropriate for computer use.

Many speakers now incorporate state-of-the-art 3-D technologies, such as SRS, Spatializer and Dolby Surround. No matter what the brand name, all use their own algorithmic mumbo jumbo that manipulates sound frequencies to produce a fool-the-ear 3-D sound from two speakers, adding more presence to a formerly flat sound.

When shopping for speakers or headphones, keep these buying tips in mind:

- Look only for AC-powered speakers, because battery-powered speakers are limited in their output.
- Turn up the volume. Good speakers can carry the load at high volumes, whereas mediocre or inferior speakers may frequently create distortion and/or crackling.
- Look for speakers that offer a convenient front-panel volume control as well as a headphone port. If you have to connect your headphones (as you might in an office setting), you are spared the bother of finding the hard-to-reach sound card connection on the back of the computer.
- Make sure headphones adjust snugly without pressing against your ears. Continual pressure causes discomfort after a while.

Michael S. Lasky is a PC World *senior associate editor.*

For more information about all products in this article, circle reader service no. 907.

CinePlex 1500

With built-in Dolby Pro Logic Surround Sound—much like you hear in movie theaters today—the five-speaker system produces hair-raising realistic sound. The Dolby Surround has been optimally encoded for the three 18-watt speakers, and two 15 watt surround speakers, but SSI has added a sixth 30-watt channel for bass. Listen to the Rolling Stones, and you'll think they're right in the room. Play *Doom*, and you'll feel as if you're in a war zone. *SSI Products, Inc., $299, 800/845-4774*

Reader service no. 700

The CinePlex 1500

The Imager, LCS-3210 Speakers

Labtec has teamed up with Spatializer Audio Labs to produce The Imager, a stand-alone sound enhancement system that fits between your sound card and speakers. Now it's possible to upgrade existing speakers with Spatializer's richer sound. The audio illusion technology even adds presence to the sound put out by previously tinny, low-end speakers. The company

The Imager, LCS-3210 Speakers

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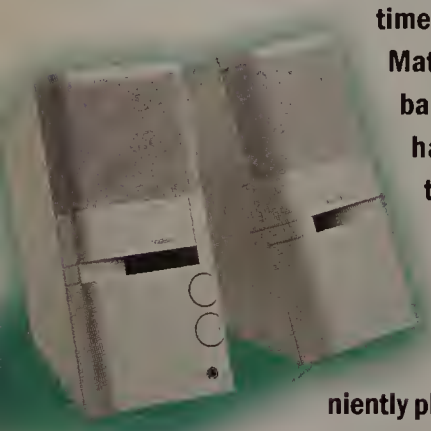
has built Spatializer into its LCS-3210 Speakers, eliminating the need for a separate Imager device. Alas, the speakers have only a too-low preset enhancement level. *Labtec, $39.99 street, 360/896-2000*

Reader service no. 701

MediaMate Computer Speakers

To get deep, thumpin' bass sounds you need a three-piece subwoofer, right? Well, most of the time. Bose MediaMates produce deep bass from a pair of handsome desktop units that are well suited to office settings—if only because of their conveniently placed front headphone jack and volume control. The speakers have been optimized for short-range listening such as your desktop workspace, and handle dual source input. *Bose, street $229, 800/444-2673*



MediaMate Computer Speakers

Reader service no. 702

Pro 4000 Lightweight Stereo Headset

For less than ten bucks, the large, comfortable earpads and rich, full sound come as a true—and pleasant—surprise. They feature a volume control on the 9-foot cord, and gold-plated adapter plugs for all stereo devices and sound cards. Even if you're not on a budget, these deluxe quality headphones are a terrific value. *MEI/Micro Center, $9.97, two or more $8.97, 800/634-3478*

Reader service no. 703

Right Touch ConcertMaster Multimedia Keyboard

If your desktop is short on space, a pair of multimedia speakers can complicate your real estate problem. NMB's Right Touch ConcertMaster Multimedia Keyboard with built-in speakers might be a practical, space-saving solution. The speakers employ the SRS 3-D stereo technology to provide a warmer, fuller sound that belies the size of these 2-watt baby "boomers." The keyboard panel also sports an omnidirectional microphone, a volume control, a mute button, and headphones and external speaker outputs. However, because of its height, you may not be able to fit the unit on an under-the-desk keyboard shelf. *NMB Technologies, $129.95 street, 800/662-8321*

Reader service no. 704

Right Touch ConcertMaster Multimedia Keyboard

The Quiet Zone 2000

You want to shut out the world. Put on these comfortable fold-up headphones and block out the annoying sounds of, say, a busy office or an airplane cabin. The Quiet Zone 2000 headpiece attaches to a small, battery-powered processor box that has a "noises-off" activation button, which erases any external sound up to 20 dB. Tiny microphones embedded in the earcups sense and process out the surrounding low-frequency noise. The collapsible headphones and processor store easily in a supplied bag, making them great for travel. Oh, and while they tune out external sounds, they tune in a nice, full sound. You truly are in the Quiet Zone. *Koss Corp., $199.99, 800/872-5677*

The Quiet Zone 2000

Reader service no. 705

W440 Deluxe Stereo Wireless Speaker System

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W440 Deluxe Stereo Wireless Speaker System

Reader service no. 706

Vivid3D speakers

The Vivid3D speakers have SRS circuitry conveniently built right into them. Using the front panel knob, switch back and forth from SRS to conventional sound, and you'll notice that conventional sound seems flatter. With SRS, the sound seems to be sweeping in a halo around your head. The speakers have a 35-watt amplifier, and they're even able to synthesize a stereo signal from a mono source. *NuReality, $179.95, 800/501-8086*

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HELP LINE Q&A

Ease Backup Pain

Q Every issue of *PC World* tells me at least a dozen times to back up my data. Can you provide a definitive list of files (for Windows 95, preferably) that I should archive the next time I read this caveat?

Grant Miller, PC World Online

A Judging by most magazines and books, only crazed daredevils don't back up their data every day. The reality is that backing up several hundred megabytes is time-consuming and complicated, and restoring it even more so. With so many programs and operating systems now available on CD-ROM, reinstalling them is often a lot less work—but it won't bring back lost data and configuration files.

Windows 95 makes matters even worse. Currently, no native Windows 95 backup program comes with a command-line restore utility, which means you have to reinstall Windows before you restore anything. Existing DOS and Windows 3.*x* backup programs don't support Windows 95's long file names, and Win 95's own backup program is short on tape drive support.

I can't provide a definitive list of files to back up, but I can give you a simple guideline: Back up those files you can't live without, or can't restore from another source. That means data files, configuration files (including the various .ini files), and any programs for which you don't have installation disks. Don't forget e-mail and fax program inboxes, Windows Cardfile, Schedule+ data, communications program scripts and dialing directories, and, of course, config.sys and autoexec.bat. **FIGURE 1** on the next page lists extensions of some key files.

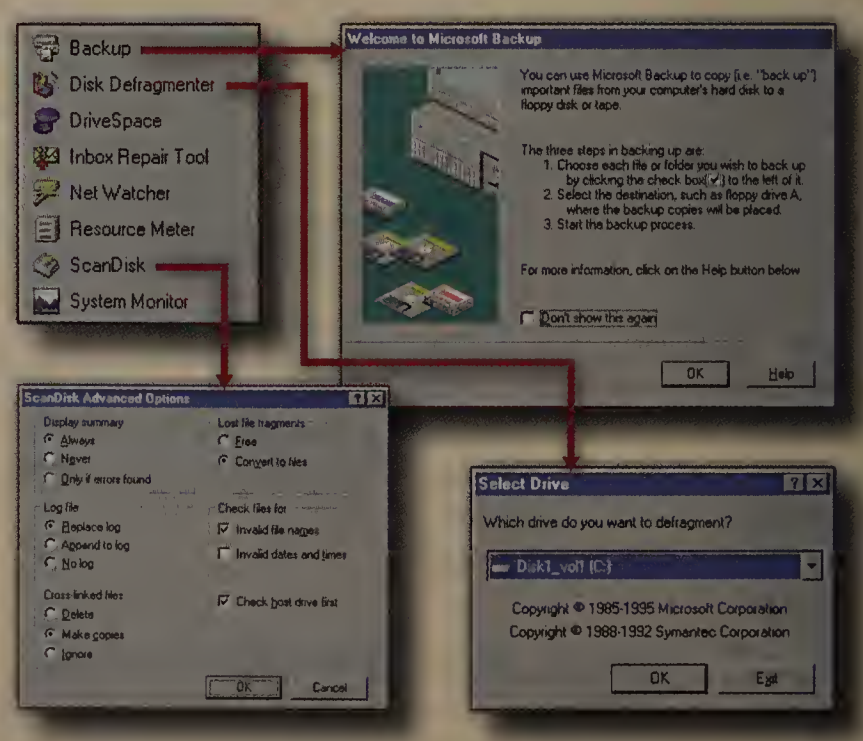
You'll find backing up easier if you put all these files on the same hard disk or partition or, better still, under one subdirectory if that's practical. To make backup even more painless, use the Backup applet in the Systems Tools folder contained in Windows 95's Accessories folder (see "Win 95 Tools Tune Your PC").

To Partition or Not to Partition

Q In September's *Help Line*, Brett Glass said he partitioned a 1GB hard drive into eight 127MB logical drives to create more efficient 2K clusters. I remember reading somewhere that each drive letter requires a small

Win 95 Tools Tune Your PC

Some things never change. Upgrading to Windows 95 doesn't mean you can skip system maintenance chores. But it does make them easier. The System Tools folder in the Accessories folder contains several utilities that help you protect data, optimize performance, and check your disk's integrity. Backup lets you copy your entire hard disk or selected files to a floppy disk or tape. The Disk Defragmenter speeds up disk access by reassembling fragmented and scattered files. To detect and fix errors on your disk, run ScanDisk. If you buy the Microsoft Plus Companion product, you get enhanced versions of some of these tools.



PETER HOEY

Type	Extension
Batch files	.bat
Configuration files	.cfg, .dat, .ini
PIM files	.org, .scd, .sch
Presentation files	.ppt, .pre, .prs, .wpg
System files	.sys
Windows Cardfile	.crd
WinFax files	.fx*
Word processing files	.doc, .wpd, .sam
Worksheet files	.xls, .wk*, .wb*, .wq*

FIGURE 1: BACK UP DATA YOU CAN'T REPLACE or can't restore from other sources, like these key files.

amount of conventional RAM. Eight hard drive partitions, one floppy disk drive, and one CD-ROM make ten letters. Where is the balance between storage efficiency and RAM? Also, does Windows 95 suffer from the same cluster-size conundrum as DOS?
Peter Maggio, Chicago

A Drive partitioning is a matter of taste, and with hard disk prices continuing to fall, often a moot point. Depending on how you use your hard disk, one scheme may make more sense than another. If your files are generally small, choosing smaller partitions may be more efficient.

Personally, I prefer to create partitions just under 512MB because to me, the inconvenience of partitions smaller than that outweighs the few megabytes lost to 8K clusters. (Clusters are the units of space allocated to files on the hard disk. All the clusters on a disk are the same size, but that size depends upon the size of your disk's partitions.) Larger partitions and their concomitant larger clusters (16K for 512K to 1024K partitions, and 32K for 1024K-plus partitions) are a big waste. Formatting an entire 1.2GB drive as a single partition squanders hundreds of megabytes, since every file, no matter how small, eats up 32K. But if you're only using 500MB of your hard disk anyway, who cares?

As to the RAM cost of drive letters, it's small—ten drive letters cost only a few hundred bytes. And yes, Win 95 still uses DOS's File Allocation Table file system, so it suffers from the cluster-size problem.

Use Wild Cards in Explorer File Searches

Q Does Windows 95's Explorer let you filter the file display with a wild card (such as *.txt, for viewing only text files)? Or is there any other way to view files of a certain type? This was a cinch in Windows 3.1's File Manager.
Harry Miller, San Francisco

A The Explorer has taken some undeserved flak for being different from File Manager. If you're willing to learn a new trick, press **<F3>** in any Explorer window (or in any folder window, including My Computer, Network Neighborhood, and Control Panel), type the path and file name—wild cards included—on the Name & Location page, and press **<Enter>** (see **FIGURE 2** on the next page). To limit your search to one directory, make sure the 'Include subfolders' box is unchecked. If Explorer isn't open, you can get to the same Find dialog box by selecting *Start•Find•Files or folders.*

If you still need a bit more incentive to abandon File Manager in favor of Explorer, consider this: With one command, you can turn frequently executed file searches into one-click desktop shortcuts. The next time you do an oft-repeated search, in the Find dialog box, select *File•Save Search* to tack your criteria to the desktop. Choose

Find Answers Fast

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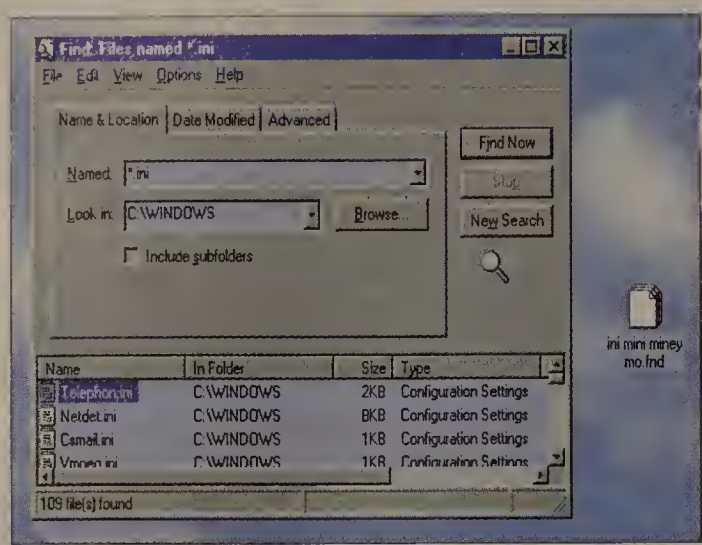

FIGURE 2: USE WILD CARDS IN WINDOWS 95 EXPLORER SEARCHES by pressing <F3> and specifying your criteria in the resulting dialog box.

Options • Save Results before you save the search to include the list of found files, a nice tool for comparing the contents of a disk or directory before and after a particular operation. Windows 95 gurus will give the shortcuts plain-English names (with the .fnd extension) and drag them to the Start menu.

If you'd rather not have to learn a new interface, no problem: Windows 95 includes a 16-bit version of File Manager that's nearly identical to that in Windows for Workgroups. Open Explorer and double-click *winfile.exe* in the c:\windows folder, or select *Start • Run*, type **winfile. exe**, and click *OK*.

Boot to Good Old MS-DOS

Q Before I upgrade to Windows 95, I need some answers to a few questions. I know that programs such as Norton Utilities don't work under Windows 95's 32-bit structure. Can I bypass Windows 95 and boot up directly to DOS? If so, would the utilities run?

Adam Dylla, Internet

A Yes, after you've upgraded to Windows 95 you can still boot to your previous DOS version. But no, you can't use most 16-bit disk- and file-related utilities, mainly because you risk losing Windows 95's long file names. Symantec has released Windows 95 versions of several Norton products (see "Tools Rush In," October, page 136).

Even if you upgrade to 32-bit versions of your favorite applications, you may still want to boot to your old version of DOS so that you can run Windows 3.*x* or programs that aren't compatible with Win 95. If you choose the dual-boot option and install Windows 95 to a directory other than the one containing Windows 3.*x*, just reboot your system, wait for the 'Starting Windows 95' message, and press **<F4>**. Or press **<F8>**, then select *Previous version of MS-DOS* from the resulting menu.

If you installed Windows 95 over Windows 3.*x*, your old DOS files are still there, but Windows 95's dual-boot feature is disabled. To enable it, switch to the root directory of your boot drive, and either enter **attrib -h -s -r msdos.sys** at the command prompt, or right-click the msdos.sys file in the Explorer, select *Properties* from the resulting menu, and uncheck *Read-only* in the Attributes section of the Properties dialog box. Next, open msdos.sys in a text editor and change 'bootmulti=0' in the [Options] section to **bootmulti=1**, or delete the line, since bootmulti=1 is the default. Save the file and reset its attributes by entering **attrib +h +s +r msdos.sys**, or by selecting from its properties sheet in Explorer.

As long as you're mucking around inside msdos.sys, you should know about some of the other Windows 95 boot options you can set there (see **FIGURE 3**). For example, instead of pressing <F8> to call up the boot option menu every time you start Windows 95, make the menu appear automatically by adding the line **BootMenu=1** to the [Options] section. As with DOS 6.*x*'s config.sys multiconfiguration menus, you can specify a default menu choice (**BootMenuDefault=**) and a delay time (**BootMenuDelay=**), during which you can choose another menu item. To see how little things have changed under Windows 95's hood, add the line **BootGUI=0** to the same section, and restart Windows. Your system will boot back up to a familiar command prompt. To start the Windows 95 graphical interface, just enter **win** at the prompt.

By Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World *and a contributor to* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Help Line *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.*

Option	Effect
BootDelay=2	Delays initial start-up 2 seconds
BootFailSafe=1	Enables Safe Mode for system start-up
BootGUI=1	Loads Windows 95's graphical interface
BootKeys=1	Enables start-up keys <F5>, <F6>, and <F8>
BootMenu=0	Hides the start-up menu
BootMenuDefault=1	Sets first menu option on Windows start-up menu as default
BootMenuDelay=30	Delays selection of default menu choice 30 seconds (if BootMenu=1)
BootMultI=1	Enables keys <F4> and <F8> for booting to previous DOS version
BootWarn=1	Displays Safe Mode start-up warning and menu
BootWin=1	Makes Windows 95 the default operating system
DblSpace=1	Loads dblspace.bin
DoubleBuffer=1	Enables double-buffering if enabled by the SCSI controller
DrvSpace=1	Loads drvspace.bin
LoadTop=1	Loads command.com or drvspace.bin at top of 640K memory
Logo=1	Displays animated logo as Windows opens
Network=1	Enables networking

FIGURE 3: GIVE WINDOWS 95 THE BOOT, and be specific. These options are the defaults Windows 95 uses if the command doesn't appear in msdos.sys. For most commands, a value of 1 (true) enables the feature, and the value 0 (not true) disables it.

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SPREADSHEETS Q & A

Excel, How's That Mutual Fund Doing?

Q I want to monitor the performance of my mutual funds in Excel, and I've devised various formulas to calculate the rates of return. But the transactions are irregular: For any given fund, I may purchase shares or receive dividends at any time. So Excel's regular irr function won't work. I thought I could use the xirr function to calculate the return since it works with nonperiodic cash flows, but I can't figure out the formula. Can you help?
Al Giddings, Cedar Crest, New Mexico

A You're on the right track. You may have been confused by the fact that xirr is an array function, which means it requires a specific arrangement of dates and cash flow values, as in **FIGURE 1**.

To set up this model, begin by making sure that the Analysis Toolpak is installed: Select *Tools*, and if the Data Analysis option is not at the bottom of the menu, select *Tools•Add-Ins*, click *Analysis Toolpak*, and click *OK*.

Now enter the sample values and formulas in Figure 1. Note that the xirr formula requires two ranges. The first, E8:E13, contains a record of the payments and receipts from your fund. The second, A8:A13, contains the dates of all transactions. The value in cell E13 is the amount you'd receive if you cashed the fund in today. Because xirr is an array formula, remember to enter it by pressing **<Ctrl>-<Shift>-<Enter>**.

Add new transactions to the model by selecting the last row of the table (here, row 13) and choosing *Insert•Rows* to add a new row. Copy the formula from E8 into the new row, and fill in the values for the new transaction.

Creating If-Then Formulas

Q I need a formula that will calculate values up to a specified limit. I use 1-2-3 to track training credits for the East Meadow fire department. A firefighter is allowed to report up to 50 training credits a year. If an individual's credit total is under 50, I want the formula to return the actual number of credits. If the total is over 50, the formula should return 50.
Carl Pugliese, East Meadow, New York

A No problem. Every spreadsheet includes a function designed especially for these kinds of calculations: In Excel, the function is if(); in 1-2-3 and Quattro Pro, it's @if().

C2 @IF(A2>B2,B2,A2)

	A	B	C
1	Training Points	Maximum Points Allowed	Total
2	65	50	50
3	35	50	35
4	46	50	46
5			

FIGURE 2: IF-THEN FORMULAS, available in every spreadsheet, return one value if a specified condition is true, another value if it's false.

Take a look at the formula in cell C2 of **FIGURE 2**, @if(A2>B2,B2,A2).

The first argument of the formula is a logical expression, A2>B2. If this expression is true, then the firefighter has exceeded the yearly limit, and the function returns the value of the cell specified in the second argument, B2. If the logical expression is false, as it is for the copy of the formula in C3, the function displays the value of the cell specified in the third argument, A2.

In Excel, the corresponding formula is if(A2>B2,B2,A2).

Prevent Widows and Orphans in Quattro Pro and 1-2-3

Q My Quattro Pro for Windows worksheets contain many blocks of information that I want to keep together on a printed page. I've tried inserting hard page breaks, but every time I add or delete a row, I have to change the page breaks. WordPerfect lets me keep a block together on a page. Why doesn't Quattro Pro?
Ruth Kuhn,
San Luis Obispo, California

A Good question! Are you listening, vendors? There's no built-in block protection in any spreadsheet, so I've put together a little macro in Quattro Pro (shown in **FIGURE 3**) that should do the trick. With a few modifications (which are noted below), the macro also works in 1-2-3.

First, you must assign a range name to each block of cells that will appear in

Track Your Mutual Funds With These Formulas

	A	B	C	D	E
1	Today's date		2/10/96		
2	Shares		200		
3	Current price		11.10		
4	Current value		2220.00		
5	Return		8.43%		
6					
7	Date	Shares	Price	Dividend	Cash Flow
8	1/1/95	100	10.00		(1000.00)
9	3/14/95	50	10.50		(525.00)
10	6/1/95			8.00	8.00
11	7/20/95	50	11.00		(550.00)
12	9/1/95			6.00	6.00
13	2/10/96				2220.00

=today()
=sum(B8:B13)
=C2*C3
=xirr(E8:E13,A8:A13)
Press <Ctrl>-<Shift>-<Enter> to enter this array formula.
=–(B8*C8)+D8
Copy to E9:E12.
=C4
=C1

FIGURE 1: EXCEL'S XIRR FUNCTION calculates the internal rate of return for a nonregular series of cash flows. Because it's an array function, it requires a particular arrangement of data.

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the report. In the example, I called them BlockA, BlockB, and so on. (Don't forget to include blank cells between the blocks.) Then you create a list of the named blocks to print. When you run the macro, it steps through each name in the list, counts the number of rows in that block, and adds it to a running count of the rows on the current page. If there's not enough room for a block on the current page, the macro inserts a page break.

To create the macro, go to a clean page in your workbook and enter the macro statements shown in Figure 3. Note that cell B21 contains a formula. When you enter the formula, it initially returns 'ERR' because the macro has not yet assigned the current block.

Select range A2..A27 and select *Block•Names*. Click *Labels*, make sure *Right* is selected in the Directions box, and click *OK*. Then click *Close*. To execute the macro, press **<Ctrl>-P**.

The macro works with five blocks of data. If your worksheet contains more blocks than this, you'll need to insert enough rows after row 6 to hold all your block names.

Below is a detailed description of the macro. The same code works in 1-2-3 for Windows with the changes noted.

{let \p_lines,0} initializes the variable \p_lines, which contains a running total of the lines on the current page.

{selectblock blocklist}{down} (in 1-2-3, **{select blocklist}**) positions the cell pointer on the first block name in the list.

{blockname.create currentblock,c(0)r(0)} (in 1-2-3, **{range-name-create "currentblock"}**) updates the name currentblock while the macro is running.

{if @cellpointer("type")="b"}{quit} halts the macro after it has processed all the block names.

{if \p_lines+@rows(@@(currentblock))>\p_pagesize}{\p_2} processes the \p_2 subroutine if adding the rows of the next block of cells would exceed the maximum number of lines specified in the cell named \p_pagesize. The formula @@(currentblock) refers to the name currently in currentblock: Thus, when currentblock refers to cell B5, @@(currentblock) yields the name BlockD.

{let \p_lines,\p_lines+@rows(@@(currentblock))} adds the number of lines in the current block to the current page total.

{down}{blockname.create currentblock,c(0)r(0)} (in 1-2-3, the second command is **{range-name-create "currentblock"}**) shifts the name currentblock down to the next name in the list.

{branch \p_1} loops back to process the next block.

The following subroutine is executed whenever a block of cells exceeds the maximum number of lines allowed on the current page:

{recalc \p_3} recalculates the dynamic macro statement in cell B21.

+"{selectblock "&currentblock&"}" (in 1-2-3, **+"{select "&currentblock&"}"**) produces a statement that selects the block where the page break is needed.

{insertbreak} (in 1-2-3, **'/wp**) inserts a page break.

{let \p_lines,0} resets the page line count to zero for the next page.

{selectblock currentblock} (in 1-2-3, **{select currentblock}**) returns the cell pointer to the list of block names.

{return} returns macro processing to cell B16.

To make the worksheet a little easier to maintain, I included a macro that clears the old page breaks from a sheet. To use it, you just select the top left cell of BlockA, and then press **<Ctrl>-K**. Here's how it works:

{if @cellpointer("type")="b"}{quit} halts the macro when it reaches the end of the list of block names.

{if @cellpointer("contents"){down}{branch \k} looks for a page break in the next cell if the current cell doesn't contain a page break.

{blockdelete.rows c(0)r(0),entire} (in 1-2-3, **{delete-rows}**) deletes the current row if the current cell contains a page break.

{branch \k} processes the next cell.

By Richard Scoville

Keep Text Blocks Together With This Macro

	A	B	
1	blocklist		
2		BlockA	
3		BlockB	
4		BlockC	
5		BlockD	
6		BlockE	
7			
8	\p_pagesize		56
9	\p_lines		
10			
11	\p	{let \p_lines,0}	
12		{selectblock blocklist}{down}	
13		{blockname.create currentblock,c(0)r(0)}	
14	\p_1	{if @cellpointer("type")="b"}{quit}	
15		{if \p_lines+@rows(@@(currentblock))>\p_pagesize}{\p_2}	
16		{let \p_lines,\p_lines+@rows(@@(currentblock))}	
17		{down}{blockname.create currentblock,c(0)r(0)}	
18		{branch \p_1}	
19			
20	\p_2	{recalc \p_3}	
21	\p_3		ERR
22		{insertbreak}	
23		{let \p_lines,0}	
24		{selectblock currentblock}	
25		{return}	
26			
27	\k	{if @cellpointer("type")="b"}{quit}	
28		{if @cellpointer("contents"){down}{branch \k}	
29		{blockdelete.rows c(0)r(0),entire}	
30		{branch \k}	

List the names of the blocks containing lines that you want to keep together.

Enter the maximum number of lines you want on each page.

This cell contains the formula +"{selectblock " &currentblock&"}".

This macro clears old page breaks.

FIGURE 3: KEEPING BLOCKS OF TEXT TOGETHER isn't easy in any spreadsheet. This macro for Quattro Pro (and, with a few modifications, 1-2-3) can help.

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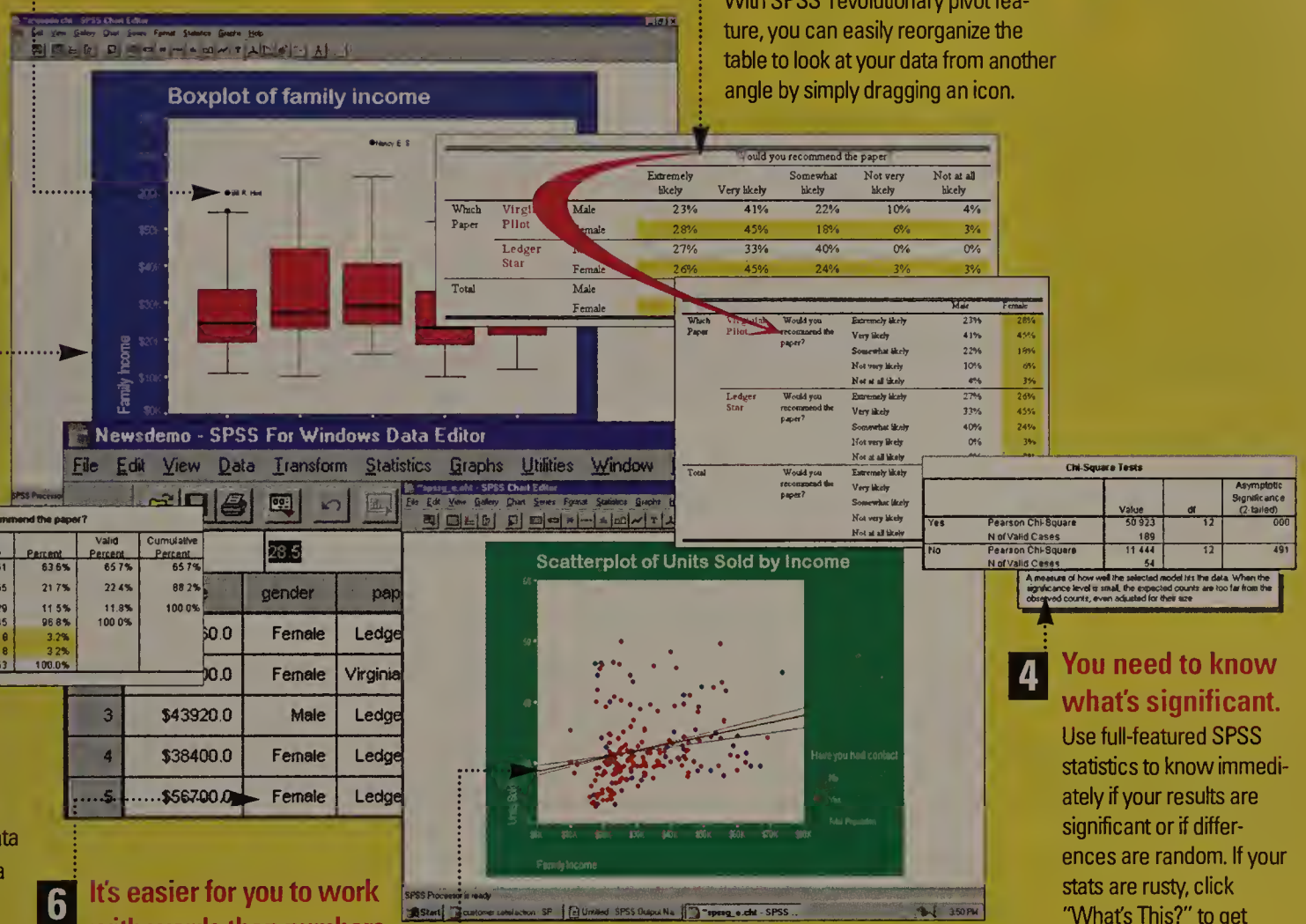

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AGENDA

MORNING SESSIONS - 9:00-12:15

- **Hype, Health, and Heartache in IT and Communications Markets**
  Vicki J. Brown, Senior Vice President
- **The Era of the Wired Consumer: Discontinuity, Opportunity, Success, and Failure**
  Frank Gens, Senior Vice President, Worldwide Research
- **The Internet's Impact on Corporate Computing**
  David Vellante, Senior Vice President, Systems, Software, & Storage
- **Technologies for the Wired Market**
  John Gantz, Senior Vice President, Personal Systems and Collaborative Computing

Session A 1:15 - 1:55	Session B 2:00 - 2:40	Session C 3:00 - 3:40
TRACK 1		
Planet PC: The Global Market Perspective Bruce Stephen	**Home Computing: Fitting and Creating Demand** Richard Zwetchkenbaum	**Mobile Computing and Communications in the Connected Age** Randy Giusto · Michael French · Iain Gillot
TRACK 2		
Cyberbucks: Mass Market Retailing Gigi Wang	**Application Hosting in the Cyber Millennium** Mark Winther · Michael Sullivan-Trainor	**CyberAge LANs** Lee Doyle
TRACK 3		
Systems & Server Market Dynamics Jay Bretzmann	**Will Intel Own the Workstation Business?** Dr. Thomas Copeland	**Internet Servers of the 21st Century** Susan Frankle · Mark Winther
TRACK 4		
Opportunity in Networked Software Dr. Anthony Picardi	**Where's the Leverage: Database or Applications?** Clare Gillan · Dan Kusnetzky	**Can Netscape Break Microsoft's Stranglehold?** David Card
TRACK 5		
Developing Channel Partnerships for Superior Service Delivery Traci Bair	**Marketing Desktop Services: Hidden Costs No Longer Hidden** Kurt Johnson	**Distribution in the Era of the Electronic Marketplace** To Be Announced
TRACK 6		
Worldwide IT Market Outlook Philippe de Marcillac	**Network Computing Challenges in Latin America** Paul J. Pastrone	**IT Market Restructuring in the Asia/Pacific Region** Davis Blair

CLOSING SESSION - 3:55 - 4:40

- **Industry Call-To-Action**
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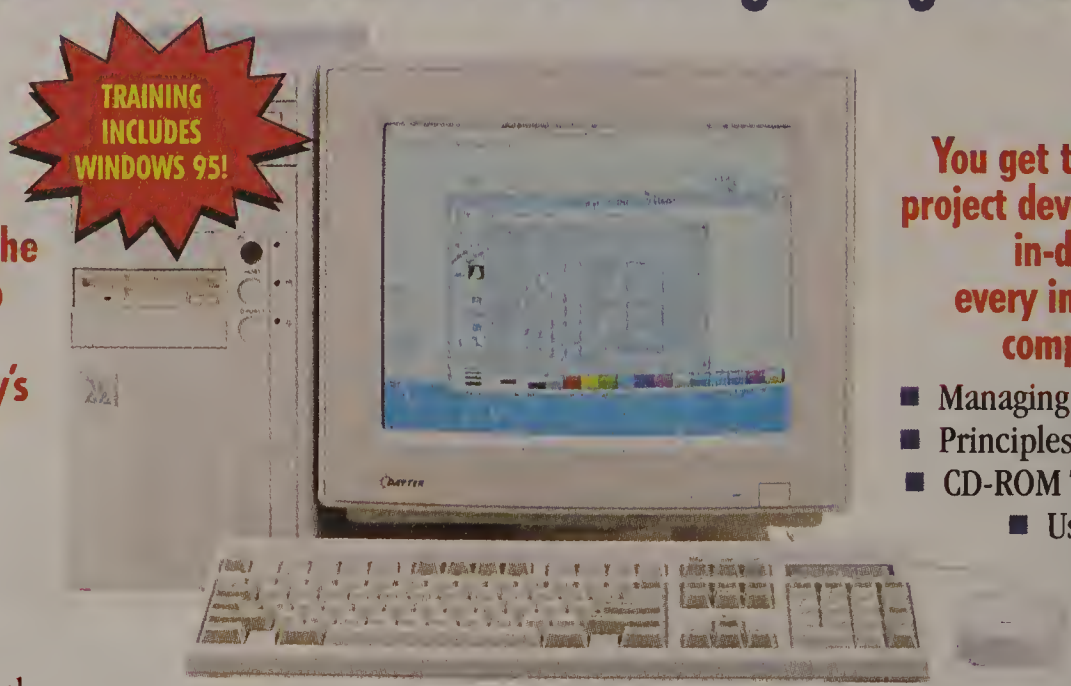

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WORD PROCESSING Q&A

Change WinWord Margins on the Fly

Q Is there an easy way to change margins in the middle of a Word 6.0 for Windows document? I create many multipage letters, and I need to print the first page on company letterhead with one set of margins, and the subsequent pages on plain paper with another set of margins.

I know how to use Word's sections to set this up, but I'd like to be able to change margins on the fly without going through the hassle of creating section breaks.

Alan Derwood, Salem, Oregon

A This isn't too tough a job, really, as long as all you want to do is change margins. After opening a new document, select *File•Page Setup*, click the *Margins* tab if necessary, specify the margins you want for the first page, and click *OK*. Now, just type your document without worrying about margins.

When you're finished typing and editing, select *Edit•Go To*, type **2** in the Enter Page Number box, then click *Go To*. This moves the cursor to the top of page 2. Click *Close*.

Now, select *File•Page Setup*, and in the Page Setup dialog box make any changes you wish in the margin settings. Next—and this is the critical step—click the *Apply To* drop-down list in the dialog box and select *This Point Forward*. Click *OK* to apply the margins you specified to the second and following pages of your document.

Turn Off Automatic Numbering in Word 95

Q I like some of the new things Word 95 can do, such as check spelling as I type and format fractions automatically. But I don't like the way it starts a numbered list whenever I type a number at the beginning of a paragraph. I often need to type several paragraphs under one numbered paragraph, and Word insists on inserting the next number in the sequence as soon as I press <Enter>. How do I stop this annoying behavior?

William French, Topeka, Kansas

A Automatic numbered lists, bulleted lists, and automatic fractions are all part of Word's AutoFormat feature. To enable or disable any of these features, select *Tools•Options*, click the *AutoFormat* tab in the Options dialog box, then select or deselect its check box.

To turn off the numbered list feature, deselect the *Automatic Numbered Lists* check box and click *OK* to make this the new default.

If you prefer to keep the option on but want a quick way to stop the numbering while you work, just press **<Enter>** twice to start the next paragraph, or press **<Backspace>** to erase the automatically inserted number. Doing so turns off the numbering until you type a new number followed by a period, hyphen, or close parenthesis.

Select Vertical Blocks of Text in WinWord

Q In Word 2.0 for Windows, I used to be able to select a vertical block of text by holding down the right mouse button and dragging over the text. I recently switched to WinWord 6.0 and found I could no longer use this technique. Is this capability gone for good?

William H. Sell, Platte City, Missouri

A It's still there, but you have to do the job differently. Since Word 6.0 uses the right mouse button to call up a menu, the old right-click-and-drag technique won't work. Instead, you have to hold down the **<Alt>** key while you left-click and drag over the text. That will select vertical blocks of text, independent of line endings or other limitations, as in **FIGURE 1**. This is especially handy in tabbed text. You can then cut and paste or drag and drop the block in your document.

But note that this feature does not work in text formatted as a table. And Word 6.0 also dropped the old Tools•Calculate command, which added up a column of numbers selected as a rectangular block and stored the result in the Windows Clipboard.

Mix WordPerfect DOS and Windows Keyboards

Q I often type lists of telephone numbers in WordPerfect 6.1. I've tried using the number pad for this task, but whenever I press the minus key to insert a hyphen, the cursor jumps to a different location in the document. What's happening?

Eric Fishbein, Staten Island, New York

A Your problem stumped me for a long time. Then I remembered that WordPerfect 5.1 for DOS uses the number pad's plus (+) and minus (–) keys to move the cursor from the top to the bottom of the current screen.

You must have selected the *WPDOS Compatible* keyboard layout as your keyboard preference; WordPerfect is now giving you exactly what you asked for—and this includes those pes-

Poisonous Animal	Toxic Effects and Comments	Distribution
Brown spider	Stinging or burning, blanching at site surrounded by redness, blistering, bleeding, ulceration, fever, cardiovascular collapse, convulsions, and sometimes death	United States, South America, Europe, Asia
Black widow	Localized swelling, intense cramping of abdomen, legs, chest, and back; nausea, sweating, respiratory distress, chills, rash, fever, numbness, tingling; and sometimes death	Tropical and temperate regions
Scorpion	Sharp burning sensation, swelling, sweating, restlessness, salivation, confusion, abdominal pain, chest pain, numbness, respiratory distress, convulsions, and sometimes death	Warm temperate and tropical regions

FIGURE 1: SELECT A VERTICAL BLOCK OF TEXT in WinWord 6.0 by holding down the <Alt> key while you left-click and drag.

ky number-pad cursor-movement keys.

For a quick fix, select *Edit•Preferences*, then double-click the *Keyboard* icon. Select *WPWin 6.1 Keyboard*, click *Select*, then click *Close*. Now your number pad keys will behave the way you want them to, but you'll lose other WordPerfect for DOS keystrokes.

If you want to use WordPerfect 6.1's number pad keystrokes while preserving the rest of the WordPerfect for DOS keystrokes, you can do that too. Follow these steps to create a new keyboard template based on the WPDOS Compatible keyboard.

1. Select *Edit•Preferences*, double-click the *Keyboard* icon, then click *Copy* in the resulting dialog box.

2. In the Select Keyboards to Copy list of the Copy Keyboards dialog box, choose *<WPDOS Compatible>* and click *Copy*.

3. In the To section of the resulting OverWrite/New Name dialog box, type a new name, such as **numpad fix**, for the keyboard you're about to create, then click *OK*.

4. In the Keyboard Preferences dialog box, select your new keyboard name, then click *Edit*.

5. In the Keyboard Editor dialog box, scroll down the Choose a Key to Assign or Unassign list and select the *Num +* entry, as in **FIGURE 2**. Click *Unassign* to remove the Move Screen Down action from the keystroke. Do the same for the *Num –* entry.

6. Finish by clicking *OK*, *Select*, and then *Close*.

This new, edited keyboard lets you keep the familiar WordPerfect 5.1 keystrokes, while using the minus key on the number pad to insert a hyphen.

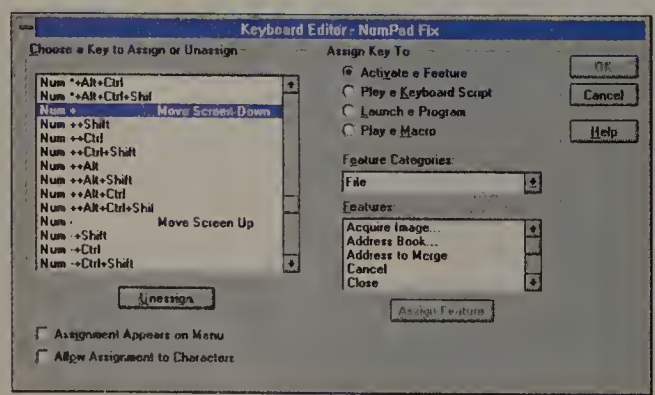

FIGURE 2: IN THE KEYBOARD EDITOR, combine WordPerfect's DOS-compatible keystrokes with Windows keystrokes.

Check Spelling as You Type in Word Pro

Q After I upgraded from Ami Pro 3.1 to Word Pro 96 for Windows 3.1, I was looking forward to using the feature that highlights misspelled words as soon as they're typed. I selected Edit•Check Spelling to put the spelling toolbox on the screen, and then I started typing.

As I typed, though, the spelling box flashed and each character appeared highlighted until I completed a word. And sometimes the program slowed down so much that I could type several words ahead of the screen display.

As it is, the feature is useless to me. Is there a way to make it work better?
Caroline Dark, Boise, Idaho

A Sure. While displaying the spelling tool on the screen may seem like the way to perform as-you-type spelling checks, there is a better way. Unfortunately, it's not very well documented.

First, remove the spelling tool from the screen by clicking *Done*. Now, select *View•Show/Hide•Misspelled Words* from the menus, as shown in **FIGURE 3**. From then on, Word Pro will highlight your misspellings as you type, but without flashing and slowing down. You can correct your errors by retyping as you go, or you can wait until you're finished typing and correct them later. If you don't want Word Pro to interrupt your concentration by highlighting misspellings, the latter option is best: After you've finished your document, select *Edit•Check Spelling*.

Unfortunately, there's no way to make the Show Misspelled Words option the default, so for each new document you'll have to repeat the process of selecting it from the menu.

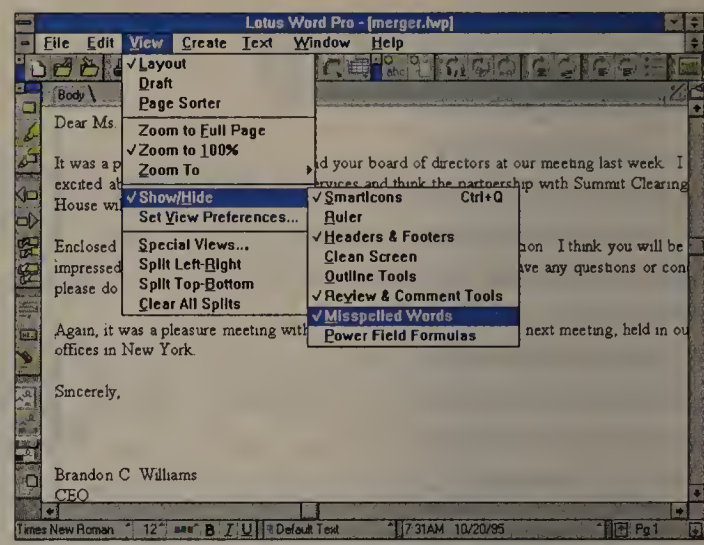

FIGURE 3: TURN WORD PRO'S AS-YOU-TYPE SPELLING CHECKER on and off with this menu command rather than displaying the spelling toolbox.

Change Ami Pro's Default Page Size

Q All the letters I create must be printed on legal-size paper. When I create a new document in Ami Pro 3.1, I have to reset the paper size every time with the Page•Modify Page Layout command. This is annoying, to say the least. Is there a way for me to force Ami Pro into using legal-size paper for all normal documents?
Judith Ann Devos, Cincinnati

A Default page-size settings, like most other document settings in Ami Pro, are stored in the program's style sheets. That's the key to fixing your problem. These two steps will change the default paper size to legal:

1. Open a new document, just as you would to create one of your letters. In Layout mode, select *Page•Modify Page Layout* and select *Page settings*, then select *Legal* in the Modify Page Layout dialog box. Click *OK*.

2. Select *Style•Save as a Style Sheet*, and click *OK*. Click *Yes* when asked whether you want to overwrite the existing style sheet.

By George Campbell

George Campbell is a contributing editor for PC World *and a contributor to* The PC Bible *(Peachpit Press, 1995, 510/548-4393).* Word Processing *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.*

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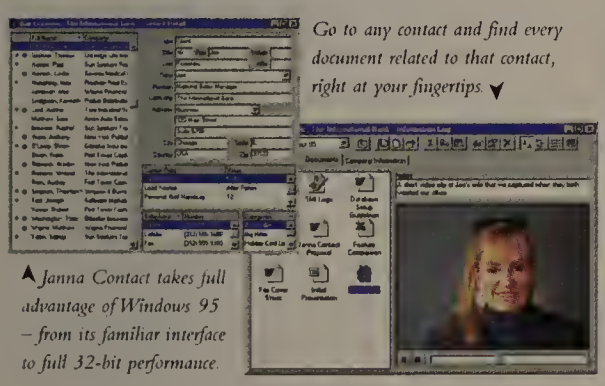

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WINDOWS Q&A

Free Password Protection for Windows 3.x

Q I'm wondering if there's a way to password-protect Windows 3.1. It would be nice to have my system protected by such a prompt.
Bob Elliot, Brooklyn

A Unlike Windows 95, Windows 3.*x* does not include password protection at start-up, but you can modify the screen saver password prompt so it appears each time you start Windows. Savvy Windows users can overcome this ploy, but it's free and may foil run-of-the-mill snoopers.

Here's what to do (see the figure below for a summary of the procedure). First, back up your win.ini file just in case something goes wrong. In File Manager or Program Manager, choose *File•Run*, type **win.ini**, and press **<Enter>**. In the [windows] section, look for the line that begins 'programs='. Add a space followed by **scr** at the end of this line. The result should look something like this: **programs=exe com pif bat scr**. Save win.ini and exit your text editor.

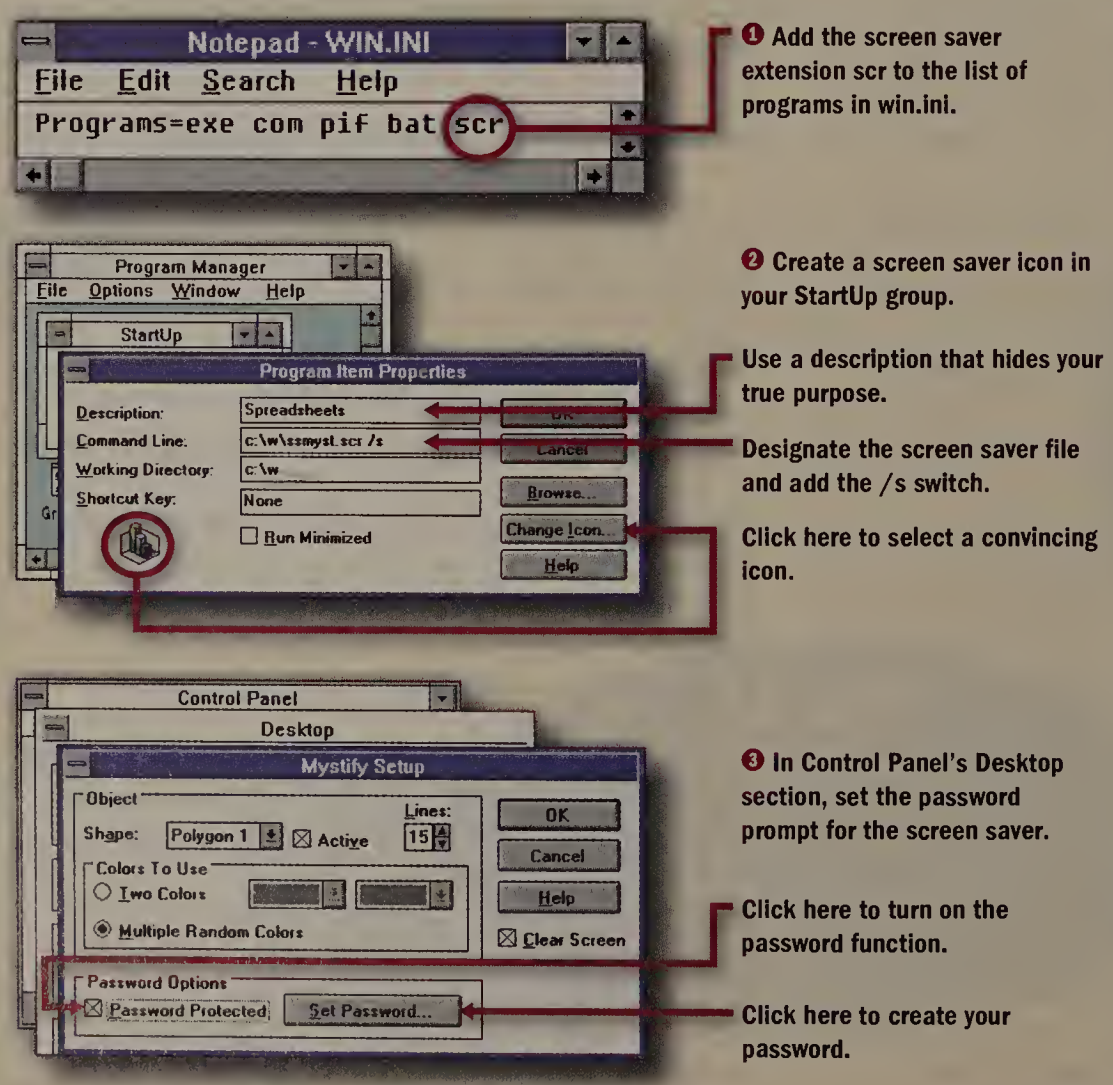
Now go to Program Manager and open the StartUp group. Choose *File•New*, select *Program Item*, and click *OK*. On the description line, type anything you want, preferably something obscure. On the command line, type the name of one of your Windows .scr files (ssmarque.scr, ssstars.scr, or ssmyst.scr, for example) followed by a space and the **/s** switch to activate it. For instance, if you include the complete path, your command line might read **c:\windows\ssmyst.scr /s**.

To give the icon an appearance that belies its true purpose, click *Change Icon*. (If you get a message that the path is invalid, click *OK* to ignore it.) Click *Browse*. Select a file containing icons, such as moricons.dll or progman.exe, and click *OK*. Select an icon and click *OK*. Click *OK* again to close the Program Item Properties dialog box. You may get an error message that no associations exist for your .scr file, but you can click *OK* to ignore it.

If you haven't already done so, you need to set up your personal password. Start Control Panel, double-click the *Desktop* icon, and select the screen saver you indicated in the StartUp group. Click *Setup*, check *Password Protected*, then click *Set Password*. Enter your new password twice, and then click *OK* three times to close all dialog boxes.

The next time you start Windows, your screen saver will ask for a password before any work can be done. For added security, start Windows from your autoexec.bat file (make **win** the last line in that file) so your system goes right into Windows.

Add Password Prompts to Windows 3.x Screen Savers



YOU CAN ADD PASSWORD PROTECTION in three steps: (1) Add the screen saver extension scr to the list of programs that Windows recognizes; (2) create a program item for your screen saver in your StartUp group; (3) set up your screen saver with a password prompt in Control Panel.

A Temporary Thing

Q A friend and I got into a long discussion about deleting *.tmp files in the Windows temp directory. I say it's safe to delete them because they were meant to be used temporarily and then discarded. My friend says I'm courting disaster if I do that. Who's correct?
Michael Sumin, Internet

A You're both right. Windows applications create .tmp files for various purposes, such as storing information for undo commands or as printer spool-

Type this in at 10:30... **...Print this out at 10:33.**

```
Get price quotes.
Is money in the budget?
   (Yes)
   Fill out Purchase Requisition
   Form #P-27.
   (No)
   Fill out Purchase Requisition
   Form #P-95.
Purchase Amount:
   (Under $100 use corporate
   credit card)
   (From $100 to $999 use purchase
   order terms 2-10 Net 30)
   (From $1,500 to $5,000 use
   purchase order terms Net 15)
Submit Requisition.
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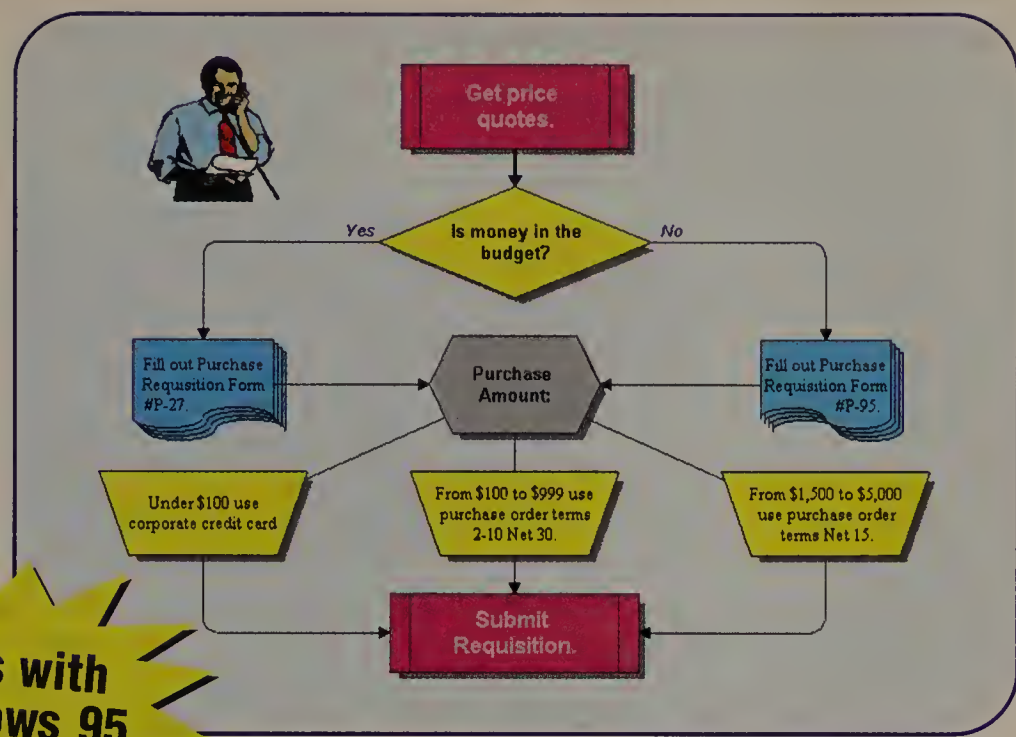

Runs with Windows 95

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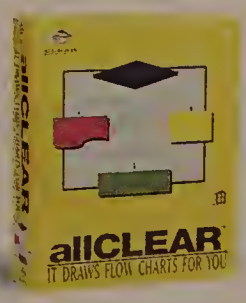

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PW-396

ing files. Normally these files are deleted when you exit an application, but if a crash occurs, they can hang around until you clean them up.

Deleting .tmp files while Windows is running can cause problems for applications that need them. But it's safe to eliminate the files when Windows isn't running. Exit Windows completely, and at the DOS prompt type **del c:\windows\temp*.tmp** (adjusting the path as necessary). If you're using Windows 95, restart the computer in MS-DOS mode to clear out these files.

Undo That Voodoo That You Do So Well

Q I like how Windows 95's Explorer forgives me when I'm sloppily dragging files hither and thither and lets me undo almost anything. Trouble is, when I realize I've done something wrong, I'm not exactly sure which file will be affected when I choose Undo Move, Undo Delete, Undo Rename, and so on. Sometimes I choose Undo anyway, but I'm still not sure which file was changed. Is there any way to take the guesswork out of Undo?
Barbara Winchester, Dayton, Ohio

A Relax. You just need to monitor your Status Bar more closely. When you want to undo an action but aren't sure which files will be affected, open Explorer, Control Panel, or even the Recycle Bin. Make sure the Status Bar is visible at the bottom of the window; if you don't see it, choose *View•Status Bar*. Click the *Edit* menu, or right-click in a blank area of the window. Move the cursor over the Undo command and pause—don't click. Then look at the Status Bar. You'll see a more thorough explanation of what Undo will do and which files are involved. When undoing a rename action, you'll even see the old and new file names.

The Eleventh Error in Windows 3.1

Q Recently I reinstalled Windows 3.1 on my IBM 386SX machine. But now one of my DOS applications won't work in Windows. When I try to start it, I get the error message 'Unexpected DOS error: 11'. Can you help me out?
Chankyu Park, Internet

A This message usually indicates a problem with a video driver. To test this theory, in Program Manager select *File•Run*, select *setup.exe* in the Windows subdirectory, and click *OK*. Then select *Options•Change System Settings*. Change the display option to *VGA* and click *OK*. Follow the prompts to switch to this video driver, and restart Windows. If that solves your problem, try reinstalling your original video driver or getting an updated driver.

Another common cause of this message is a corrupt winoa386.mod file. To fix it, copy winoa386.mod from your Windows system directory to another directory (you can delete it once you replace it with a better version). Get out your Windows floppies and find the disk with file winoa386.mo_. Open a DOS window, type **expand**, and follow the prompts to restore winoa386.mod to your Windows system directory.

Quick Turnoff for 32-Bit Access

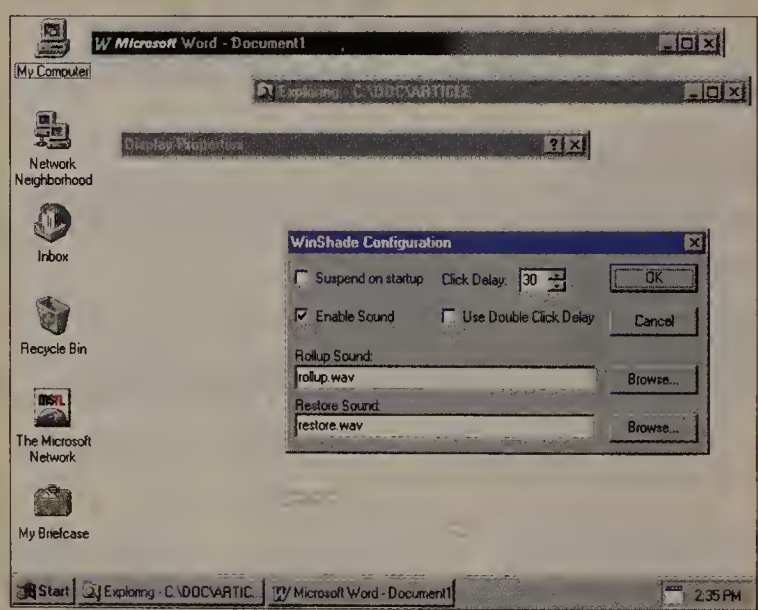
Q I use Windows for Workgroups and have a program that will not work with 32-bit file or disk access. To meet special requirements for this program, I've set up my PC to start in multiple configurations. But I need to add a line to my config.sys or autoexec.bat file to turn off 32-bit access. Can you help?
Eric Eck, America Online

A If you start Windows from autoexec.bat, you can turn off 32-bit file and disk access from the line that starts Windows. The /d:f switch turns off 32-bit disk access; the /d:c switch turns off 32-bit file access. To turn off both, you'd start Windows with the line **win /d:f /d:c**. Then use SmartDrive or other disk caching software for the configuration that lacks 32-bit file access to help make up for the performance hit.

By Scott Dunn

PC WORLD online *The files mentioned in this article are available on PC World Online. Scott Dunn is a contributing editor for* PC World *and a principal author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444).* Windows *welcomes your questions and pays $50 for published items. See page 14 for contact information.*

Windows Toolbox: Roll 'em Up



As your Windows 95 desktop becomes increasingly crowded with more application windows, dialog boxes, and property sheets, digging for the right window can mean an annoying set of clicks and keystrokes. If you want a window out of the way for just a moment, try WinShade, a shareware utility that gives any window a "roll-up" feature. Just click on the title bar of the application that's in the way, and poof—the whole window disappears, except for its title bar. You can still use the title bar to move the window as usual. And when you're ready to see the whole window, just click on its title bar again. Give this shareware program a try by downloading winshade.zip from PC World Online. For the direct approach, send the $5 registration fee to its creator, Mark Rentz, at 500 Memorial Dr., Cambridge, MA 02139-4326.

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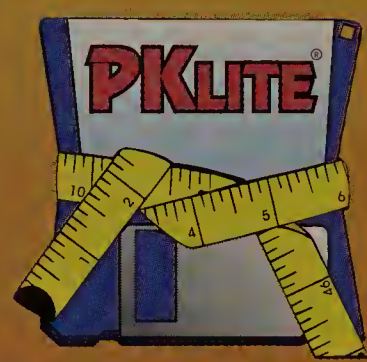

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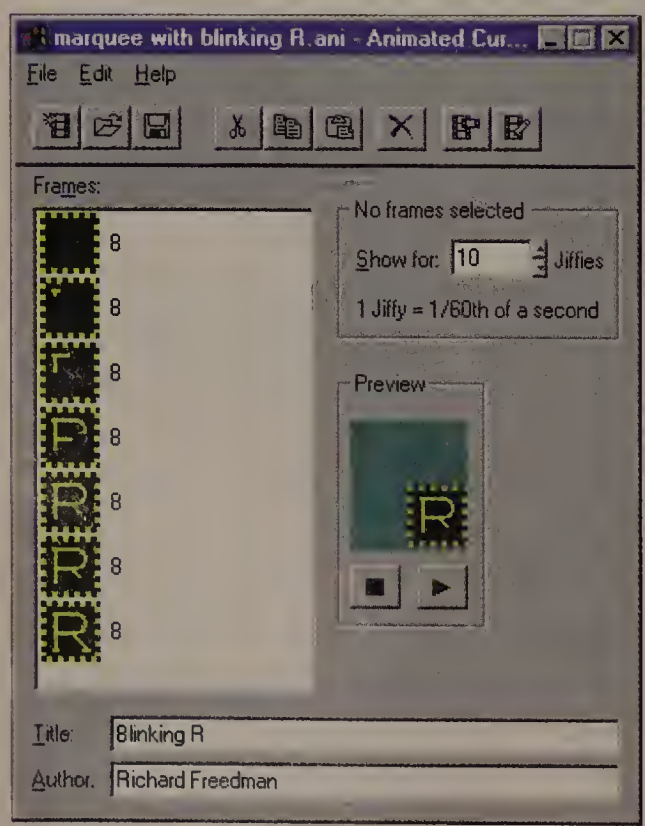
WINDOWS 95 ADVISER

Tell Windows 95 to Show Some Animation

I've always been fascinated with animation. Like many kids, I drew cartoons by doodling on successive pages of a book during algebra class. Since I don't work in Hollywood, I haven't done any animation in a long time. But now with Windows 95, the true animator in me can come out.

My artistic avenue is the cursor—the graphic that tracks mouse movements and changes as your PC changes state. A cursor can be, for example, an arrow (known as the *Normal Select* pointer) or an hourglass (known in polite circles as the *Busy* pointer).

Cursors are old hat. But Windows 95 borrows a trick from Windows NT: animated cursors. Technically, an animated cursor is a sequence of images, one displayed after another in a loop. These tiny cartoons still show the mouse's location, but their only purpose is to make you chuckle. That makes them well worth discovering.



CREATE YOUR OWN ANIMATED CURSORS, like this blinking R, with two simple editing tools in the Windows 95 Resource Kit.

Cursors, Foiled Again

Try replacing a cursor you see often—like the Busy pointer—with one of the animated cursors included in Windows 95. In the Control Panel, double-click *Mouse*, click the *Pointers* tab, select *Busy*, and then click *Browse*. If you've installed Plus, you can then choose from a number of animated cursors such as a peeling banana or a finger-drumming hand. Otherwise you'll have a choice of just two, both based on an hourglass. After selecting one, click *Open*, and then click *OK*.

Don't change the Select or Resize cursor—this will make your system very hard to use. Also, not all video cards support animated cursors; if they don't, the cursors will appear static.

Make Your Own in a Jiffy

The animated cursors included in Windows 95 and Plus, however, are strictly for the masses. True individualists, or doodlers like myself, can design their own using the animated cursor editor available in the Windows 95 Resource Kit. (The Resource Kit is a separate retail product, but if you're sufficiently patient you can download its software from **http://www.microsoft.com.**)

The animated cursor editor is actually two tools linked together. The first, the Animated Cursor Editor itself, is a simple animation frame manager. It lets you insert frames, define how long each one will appear on screen in 60ths of a second (a time period known as a *jiffy*), reorder frames by cutting and pasting, and preview your animation. The second tool is the Image Editor, a simple Paintbrush-like tool for creating and editing individual frames, which are simply standard 32-by-32-pixel Windows cursors.

To start your animation, launch the Animated Cursor Editor and select *Edit•New Frame*. This brings up a new blank frame and runs the Image Editor. When the editor starts up, choose the default display, which is *VGA-color*.

The only design concept to keep in mind is the distinction between a solid (opaque) color and a screen color. An opaque color always appears the same, regardless of where it is on screen, while a screen color is like a hole that takes on the color of whatever is behind it. Both types are clearly labeled on the color palette.

Once you have finished editing a frame, close the Image Editor and then save the image. Ignore the file name of each individual frame since the animation editor will bundle them all into a single .ani file.

The best way to create an interesting animated cursor is to experiment. But make sure to follow a few guidelines:

1. Animated cursors can be made up of any number of frames. Each frame can be displayed as long as you want.

2. But don't make your cartoon too long. After all, on a Pentium the hourglass doesn't usually stay up very long.

3. Display each frame for at least four jiffies; otherwise your animation will appear jittery. Very short frame times only work in smooth animations with many frames. Two good examples from Plus are horse.ani and coin.ani. You can open them in the animated cursor editor if you want to see how they are constructed.

Kind of addictive, isn't it? Who knows—perhaps the next *Lion King* is about to be created on your PC!

By Richard Freedman

Richard Freedman, former group manager on Microsoft's Windows 95 team, is vice president at a real estate investment firm in Stamford, Connecticut.

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Circle 3 on reader service card

DATA MANAGEMENT Q&A

Change Records Between Reports

Q I need to create several reports from an Approach database, each based on a different set of records. Is there a quick way to change records when switching between reports?

Randall Cohen, Northridge, California

A Extracting specific records for a report is easy in Approach, as well as in Access and Paradox. I'll show you how to do it in all three programs.

Approach: You can click the *Find a set of records* SmartIcon before you run each report, or create a macro to find the records for you.

Say your company's employee database looks something like this:

Last Name	First Name	Title	Department	Phone
Johnson	Ray	Special Events Mgr	PR	555-4290
Smith	Mery	Director	PR	555-4285
Mitchell	Coco	Controller	Finance	555-4125
Holly	Don	AR Supervisor	Finance	555-4130
Lee	Enka	Print Liaison	PR	555-4291
Keller	Hope	Vice President	Sales	555-4105
Ramirez	Oscar	Vice President	Finance	555-4107

Here's how to extract a list of the PR department. First, open your report in design mode, and double-click the background of the report above the header to open the Information Box.

Click the *Macros* tab, then *Define macro*. In the Macros dialog box, click *New*. Type **PR List** in the Macro Name box, and change the first entry under Command to *Find*. In the Find a Set of Records section of the dialog box, click *Perform stored find when macro is run*, then click *New Find*.

In the Find screen, enter **!PR** (your selection criterion) in the Department field, and click *OK*. Back in the Define Macro dialog box, click *OK*. Then click *Done* in the Macros dialog box.

On the Macros page of the Information Box, choose *PR List* from the 'On switch to' drop-down menu (**FIGURE 1**).

You'll want to attach a macro to the 'On switch out' setting, which finds all records again when you change from your report to another view. To do this, follow the steps above to create a new macro, but name the macro **Show All**, and click *Show All records* in the Define Macro dialog box. Then, on the Information Box's Macros page, select *Show All* from the 'On switch out' drop-down menu. The next time you switch to your report, you'll see only the records for the PR department.

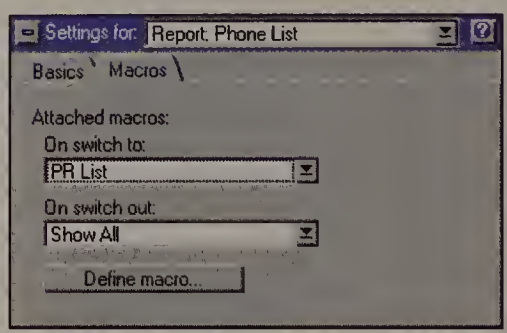

FIGURE 1: ATTACH A MACRO to an Approach report to view specified records whenever you open the report.

Follow these steps to create macros for other reports, changing the selection criteria as needed. To create more complex Finds using conditionals and wild cards, see the on-screen help.

Access: To report on a piece of a database in Access, you design a query for the records you want to see, then report on the query.

There are a couple of ways to do this: (1) You can create a new report from the results of a query, or (2) you can use the saved query results as the record source for an existing report.

The first step in either case is to design a query. Let's query the sample database Northwind, included with Access, to find employees in the United States. In the Database window, click the *Query* tab, then the *New* button. In the New Query dialog box, click *New Query*. In the Add Table dialog box, double-click *Employees*, then click *Close*.

In the query window, double-click the asterisk in the Employees table to include all the table's fields (or select a subset), making sure the Country field is in its own column. (Deselect Country's *Show* box if you included all the fields in the first column.) Type **USA** in the Criteria row for Country, and save the query as **USA Employees**.

To create a new report, click *Report* and *New* in the Database window, select *USA Employees* from the *Select A Table/Query* menu, then follow the wizard's steps.

If you have a report for a different subset of records and you like its format, just change its record source to the saved query instead of creating another report. Open the report in design mode, right-click the empty box in the top left corner of the report window, and choose *Properties* from the menu. Enter **USA Employees** on the Record Source line in the resulting dialog box, as in **FIGURE 2** (or select the query from the drop-down menu at the end of the line). Save the report with a new name.

Paradox: You can also create a Paradox report from a query, but it's easier to include a filter in your report. Since the filter is part of the report's design, you just set it up once, unless you want to change the records that appear.

Open the report in design mode, and choose *Report • Filter* from the menus. In the Filter Tables dialog box, enter your criteria in the appropriate fields, click *OK*, and then run the report.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and author of* The Paradox 5.0 for Windows Handbook *(Random House, 1994, 800/793-2665).* Data Management *welcomes your questions and pays $50 for published items. See page 14 for contact information.*

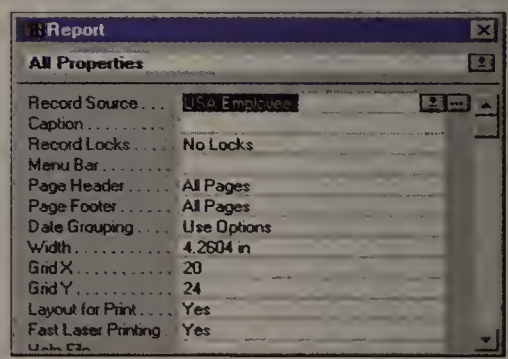

FIGURE 2: CHANGE THE RECORD SOURCE OF AN ACCESS REPORT Instead of creating a new report from scratch.

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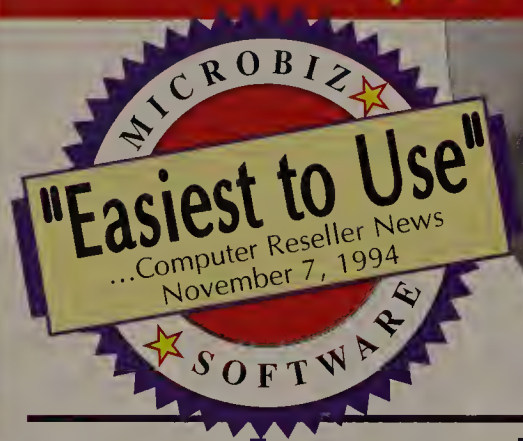

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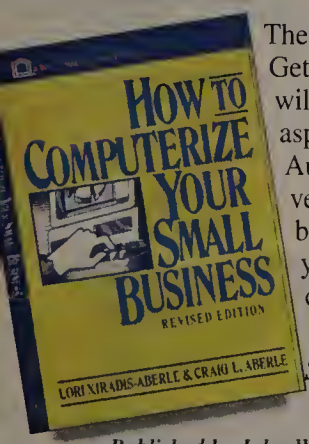

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PRESENTATIONS Q&A

Recycling Freelance Presentations

Q I want to use several slides from other Freelance Graphics 96 presentations in a new presentation I've started. What's the easiest route?
James Kowalski, Detroit

A Good news! Freelance Graphics 96 has a page-browsing feature made to order for copying slides ("pages," in Freelance's parlance) from one presentation to another. Here's how it works:

1. Open your new presentation, and click the *Page Sorter* tab (or select *View•Page Sorter*).

2. Select *File•Copy Pages from Other Files*, select a file from which you want to copy slides, and click *Open*.

3. In the Copy Pages from Other Files dialog box, Freelance displays the title and a thumbnail version of each page in the presentation, as in **FIGURE 1**. Add slides to your new presentation by dragging them into place or by marking the check box next to each slide title and clicking *Add*.

4. If you choose the latter method, Freelance asks how you wish to add the selected page(s) to the new presentation—before or after the current page or at the end of the presentation. Make your selection and click *OK*.

5. Freelance returns you to the previous dialog box, where you can continue to add pages one at a time, or choose the *Select all pages* option to copy all of the slides in one step. Either way, click *Close* when you're finished.

One caveat: Each slide you add inherits the look of the current presentation. To change that look, select *Presentation•Choose a Different SmartMaster Look* and select from the list of choices.

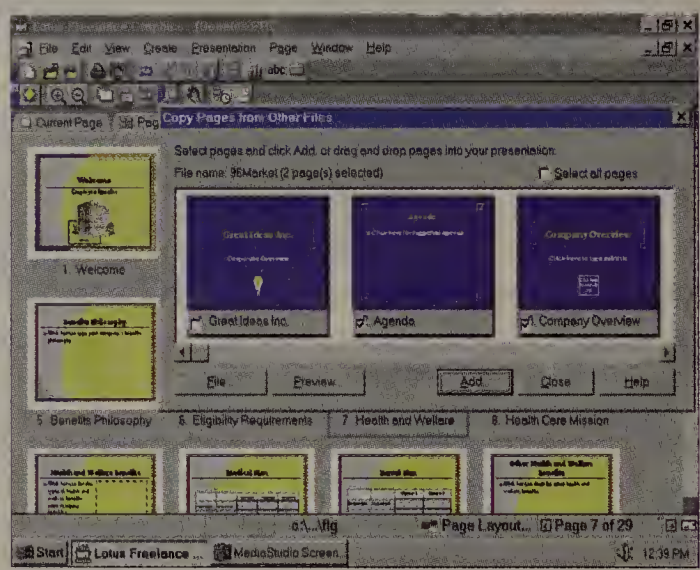

FIGURE 1: FREELANCE GRAPHICS 96 lets you easily copy or drag and drop pages between presentations.

Taking PowerPoint Shows on the Road

Q I'd like to show a PowerPoint 95 presentation to clients who have Windows 95 but not PowerPoint. What's the best way to do this?
Adam Naftalin, Kingston, Rhode Island

A Like previous versions, PowerPoint for Windows 95 includes the PowerPoint Viewer, a run-time playback utility that lets you show presentations to others whether or not they have PowerPoint. Use the program's Pack and Go Wizard to prepare your show for the Viewer. Here's how it works:

1. With the presentation open, select *File•Pack and Go* to start the Wizard, and click *Next* to proceed.

2. Click *Next* to select the current presentation. To pack more than one presentation, select *Other presentations*, click *Browse*, press **<Ctrl>** while you select the files, click *Select*, and click *Next* when you return to the previous dialog box.

3. Select the drive where you want PowerPoint to copy your presentation, and click *Next*.

4. Select *Include Linked Files* if your presentation contains sound, video, or other linked files (see **FIGURE 2**). Select *Embed TrueType Fonts* to make sure your fonts display properly. Click *Next*.

5. Select *Include PowerPoint Viewer*, and click *Next*.

6. Click *Finish*, and PowerPoint will store the files, check links, and copy the whole shebang to the proper location. If you included media clips, PowerPoint will ask you for their locations.

To present your show, first start the Windows Explorer and display the contents of the disk where your packaged presentation is stored. Double-click *Pngsetup.exe* to extract the files from your disk(s) and copy them to a designated folder. In the final dialog box, click *Yes* to run the slide show right away or *No* if you want to run it later.

To run the show later, start the Windows Explorer and display the contents of the folder where you stored the extracted files. Double-click *Pptview.exe* to open the PowerPoint Viewer dialog box, select the presentation file, and click *Show*.

By Richard Jantz

PC World *Contributing Editor Richard Jantz is an electronic publishing and presentations consultant in Kensington, California.* Presentations *welcomes your questions and tips and pays $50 for published items.* *See page 14 for contact information.*

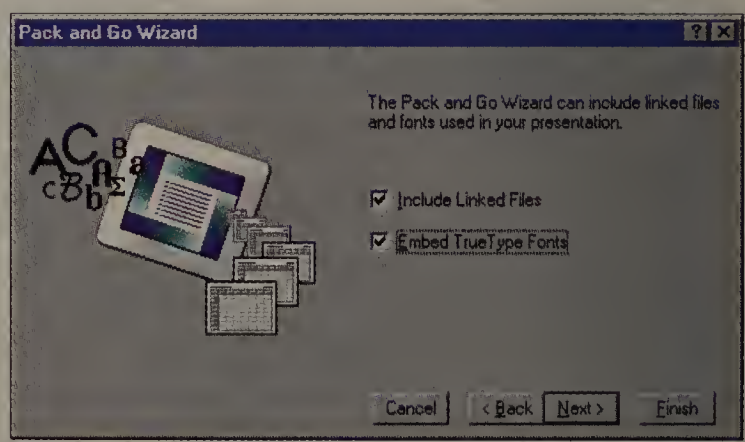

FIGURE 2: PACK SOUND, VIDEO, even TrueType fonts in your PowerPoint show before you take it on the road.

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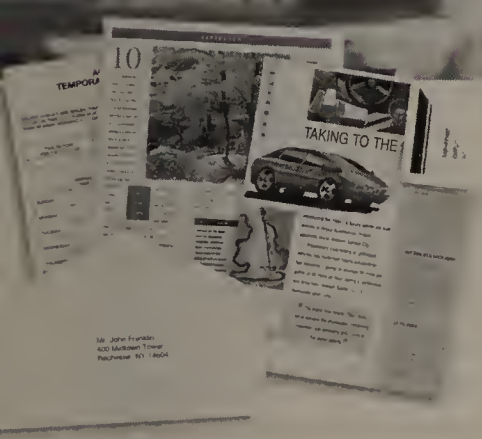

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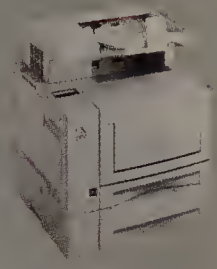
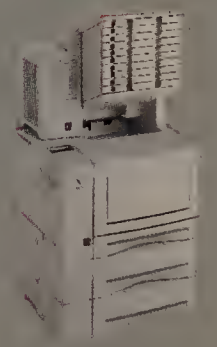


add an offset catch tray, add a duplexer, and a paper tray

or add a lockable mailbox/collator



add another paper tray

add an envelope feeder

configure it for any need

ONLINE Q&A

Women Are Wired, Too

Q Do you know of any online discussion groups especially for women, or is cyberspace still a man's world?
Catherine Mosby, Cincinnati

A The number of women online has long been wildly underestimated, since many women log on to online services through a household account (which is often in their husband's name) or a workplace one. Spokespeople and forum leaders from the big online services guesstimate that at least 40 percent of their regular users are female. Recent marketing studies of the Internet also have put female denizens at around 40 percent.

Women use online services differently than men do, and that's why we often go unseen. We focus on a few forums in the topics that interest us, discussing them avidly, while men dip their toes in everywhere.

Two online services have been started by and for women. Women's WIRE (for Women's Information Resource and Exchange) is home to a bevy of women-oriented nonprofit groups, and serves as a clearinghouse for information on women's issues. Although activist-oriented, it hosts discussions of interest to all women. Women's WIRE hosts forums on CompuServe and the Microsoft Network.

Echo is a hip, New York salon–type service for feminists (*Ms.* magazine hosts a forum there), both male and female. Among its outspoken forums is Babes in Their Cyberspace Hang-Out.

All the online services offer discussion forums for women's issues (see the table below). But if you're looking to discuss with other women particular subjects that you care about, check out the special-interest forums as well. In many of these forums, women are as active as men.

The Internet features several Usenet newsgroups devoted to women (like **soc.women**), but these are often dominated by men and tend to get raucous. Most women prefer subscribing instead to mailing list discussions. The ones I subscribe to, which range from a cat owner's list to a support group for families with a handicapped member, are 90 percent female.

Finally, you should get a copy of Judith A. Broadhurst's *The Women's Guide to Online Services* (McGraw-Hill, 1995, 800/262-4729). Broadhurst interviewed hundreds of women to find how they've used online services and the Internet, in areas of life ranging from starting a business to dealing with the loss of a loved one. The stories are remarkable as well as revelatory. Broadhurst also offers lots of street-smart online advice for women.

Join in Online Discussions of Women's Issues

Online service	Forum	How to get there
America Online	Women's Interests	keyword **women**, then select Spotlight on Women
CompuServe	Women's WIRE Online	go **women**
Delphi	Woman to Woman	from Main menu, select Social Groups, then select Woman to Woman
Echo	—	212/292-0900
Microsoft Network	Women Online and Women's WIRE	go to **women**
Prodigy	Women's Leadership Connection	jump **WLC**
Women's WIRE	—	800/210-8998

Putting Multimedia on the Web

Q I'd like to jazz up my home page on the World Wide Web. How do I add sound effects and video clips?
Jack Peterson, Detroit

A It's easier than you might think. If you already have the sound and video files, you just edit your Web page's HTML file to include links to those files. If you don't, the Internet has a wealth of sound effects and video clips that anyone can download. (But beware: Some of these files are copyright protected. Making them available on your home page is illegal.)

Recording your own sound and video isn't much harder, but it does require some extra equipment. To record sound, you'll need a sound card and a microphone. Follow these three steps to create your own sound clip:

1. Plug a tape-recorder microphone into your sound card's jack, or plug the sound card into a stereo or radio via the headphone jack. Sound that you record live will come out clearer on your Web page than sound recorded on tape.

2. Record your message with your sound card or with the Windows Sound Recorder. Select mono instead of stereo to keep the file small. And keep your sound effects brief—30 seconds of sound can translate into megabytes of disk space. Not only will that eat up your personal disk space on your Internet service, but it will take visitors to your Web page too long to download.

For the best sound, record in the highest sampling rate and size that you can, then edit the file to 8 bits with your sound-editing software. This not only keeps the file small, it makes it playable on a wide variety of hardware.

3. You can store the sound as either a .wav or an .au file, since both file formats are common on the Web these days. Files saved with the .wav extension—the Microsoft standard—offer better sound, but .au files are smaller.

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To record video, you'll need a full-motion video card that can capture video from a camcorder or VCR, and then store and play it on your PC. Video cards with an Intel Indeo chip set run about $400. Here's how to make your own movie:

1. Connect the video-out jack of your VCR or camcorder to your computer's video capture card.

2. Put no more than a few seconds of video on your Web page; otherwise it will take too long to download. Just 30 seconds of video and sound can fill up 3 megabytes of a hard disk. Record the sound and video separately, then mix them using the video-processing software that came with your video board. This keeps the file size down. Also consider not adding sound at all.

3. For the best video quality, capture at the highest frames-per-second rate and with the maximum frame size and number of colors. Then edit the file down to a manageable size by selecting a slower frame rate (15 frames per second), a smaller frame size, and fewer colors. Save file compression for your last step.

4. Save your file in either QuickTime or .avi format. The latter has become standard in the PC world, but QuickTime is more prevalent on the Web.

Now you're ready to link the sound and video files to your Web page. The link to the sound file might look like this:

```
<A HREF="sound.wav"><IMG SRC="jim.gif"></A>
Click on Jim's picture to hear him yell "Huzzah!
The fiscal year is over!" (A .wav file)<BR>
```

In the above example, the file sound.wav plays when a reader clicks on the .gif file of Jim. The note in parentheses tells readers what kind of sound file is included, so they won't download a file they can't play.

The video file link might look like this:

```
<A HREF="account.avi">Click here to see our
accounting department in action. (An .avi video)</A>
```

The above coding highlights the sentence "Click here to see..." Whenever a reader clicks on it, the video of the accounting department runs.

Finally, upload the sound file, the video file, and the new HTML file to your Internet service where the other files for your Web page are stored.

Quick Tip: Find a PC Vendor

Hunting for the phone number of a hardware or software maker? The PC Vendors Database on America Online lists addresses and phone and fax numbers for thousands of computer companies you may otherwise have a hard time finding. (I located the elusive Taiwanese manufacturer of a motherboard I purchased on the Net.) To get there, use the keyword **vendors**.

You can also tap into the World Wide Web's free database of computer vendor phone numbers at **http://foundation.mit.edu/cgi-bin/search-phone-list.**

By Judy Heim

Judy Heim is a contributing editor for PC World *and author of* Internet for Cats, The Needlecrafter's Computer Companion, *and* I Lost My Baby, My Pickup and My Guitar on the Information Highway *(No Starch Press, 1995, 800/420-7240).* Online *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.* ■

COMING UP

Living With Win 95: Straight Talk From Experts and Users

We asked our Windows 95 wizards how to maximize performance, cruise for online resources, find no-cost extras, and more. Plus results from our survey of readers on how they like Win 95.

Personal Printers: Small-Office Printing for Under $1000

Looking for a dynamite color ink jet or an inexpensive monochrome laser? Look no further than *PC World*'s latest Top 10 Personal Printers.

Quicken Versus Money: This Time, It's Personal

With Windows 95 versions of Quicken and Money, organizing personal finances has never been easier. Here's our choice for your best tools in the new age of electronic and online personal finance.

Also Next Month

- **The PC World Top 20 Power Desktops, Budget Desktops, and Notebooks, plus the PC World Top 10 Graphics Boards, 15-Inch Monitors, and Modems**
- **Personal Scanners: Our picks for the best handheld and home office scanners**
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Tilt/Rotation Control	•	•		•	
Pincushion Control	•	•		•	•
Color Balance Control	•	•			•
Color Temp. Control	•	•			•
Microprocessor Controls	•	•		PARTIAL	PARTIAL
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HARDWARE Q&A

Hard Disk CPR

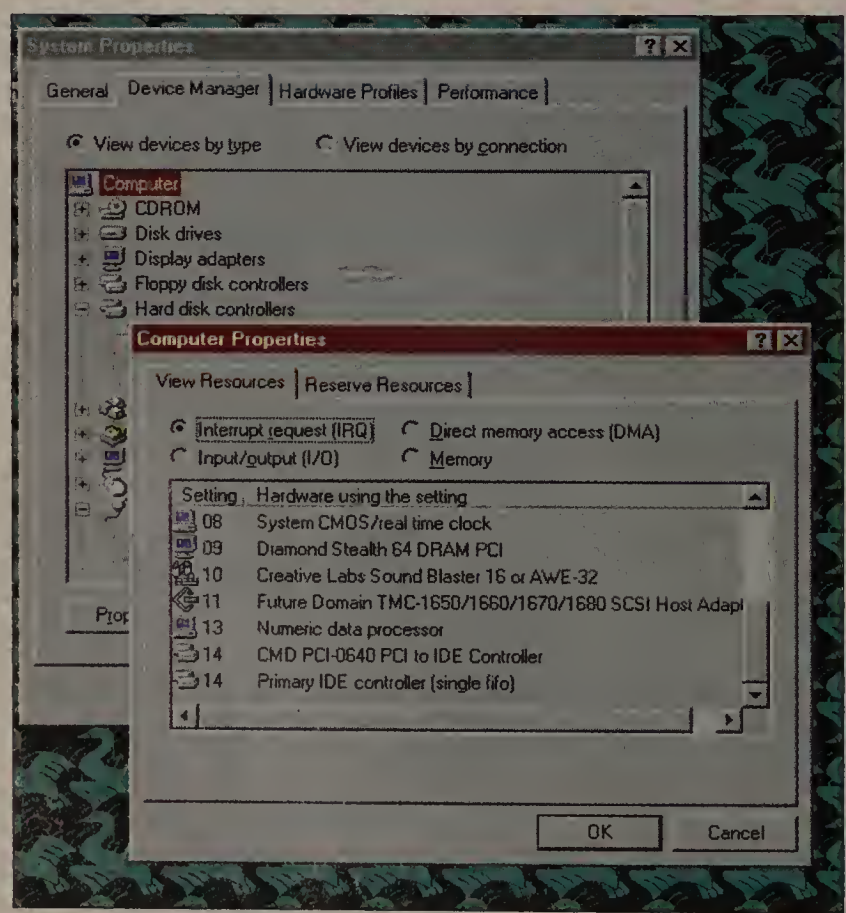
Q After returning from a vacation, I fired up my PC and found that the hard disk had gone south. The access light stays lit, but nothing happens. I tried booting from drive A: and accessing drive C:, but all I got was an error message. I've checked the hard disk settings in the BIOS and every cable connection. Is it time to admit defeat?
Art Reynolds, San Diego

A I have one last-ditch tactic. But first, a couple of warnings: If your system is under warranty, call tech support and ask if what I'm about to suggest will void the warranty—and if the tech has any better suggestions specific to your PC. Second, my little trick may damage the hard disk, so it's really for people who want to get a hard disk running just long enough to retrieve data.

If I haven't scared you off, here's what to do. Turn off your PC and remove its cover. Hold a medium-size screwdriver by the stem and give the disk one good rap with the butt end—on top of the black metal casing, not on the sides (definitely not on the side with the circuit board). Don't *whack* it, but don't just give it a little tap, either. You may need to remove the hard disk to reach the top surface of the casing.

Now try turning on your PC again (reinstalling the hard disk if necessary). If you hear the familiar whine and clickety-clack of the hard disk starting, your experiment in percussion unstuck one of the read/write heads from the platter. When hard disks sit idle, this sticky situation may arise, especially if the PC is in a hot room or in direct sunlight, neither of which is recommended.

If your PC boots successfully, start by doing a complete backup. You should be able to replace the sticky hard disk for free if your PC is under warranty. If not, do a surface scan to see if any sector of the disk is damaged (ScanDisk, included with DOS and Windows 95, will do the trick). In most cases, your hard disk can work around those areas, although you'll lose data in the damaged sectors. Keep the PC running for a while. If you don't encounter trouble after a week, and you do daily backups, you can continue using that drive.



NEED A GOOD DIAGNOSTIC UTILITY? Windows 95 comes with Device Manager. Double-click the Computer icon in the Device Manager tree for a handy, accurate readout of resources currently in use.

Hardware Help From Windows 95

Q I'm a Windows 95 user, but the devices I want to install aren't Plug and Play boards. They're the old-fashioned kind with switches and jumpers. I've tried Microsoft Diagnostics to find a free IRQ I can assign a new device to, but it makes a lot of errors, and seems useless for determining free I/O addresses. Any suggestion for a good Win 95 diagnostic utility?
Prem Maleck, Atlanta

A You already have a great diagnostic utility. In the Win 95 Control Panel, double-click the *System* icon, and click the *Device Manager* tab to see a tree with every device in your system that Win 95 recognizes (that is, every properly installed device). To make sure you're seeing the specific device models, click *View devices by connections*. Double-click any device, and a dialog box will appear. Click the *Resources* tab to see the IRQ, I/O address, and so on, taken by that device.

Or double-click the *Computer* icon at the top of the tree. In the Computer Properties dialog box, click the *View Resources* tab to see the IRQs, I/O addresses, DMA channels, and memory addresses your system uses. Set any new devices so that they don't step on the resources in use, and they'll run fine, provided you install a Win 95 driver for each device via the Add New Hardware Wizard (see "Sound Falls on Windows 95's Deaf Ears" in February).

The Next Chip Up

Q My 486DX2-66 is starting to show its weaknesses. My next upgrade must be a motherboard, and I'm considering jumping over the Pentium to a Pentium Pro board when prices settle down. Am I barking up the right tree?
Stewart Weis, CompuServe

A You're right in thinking that if you own a DX2-66, swapping motherboards is better than upgrading your CPU. A Pentium OverDrive upgrade chip will provide too little boost for too much money. Ditto for a DX4-100.

The Pentium Pro may be the wrong tree, though. This chip is designed for 32-bit apps and actually runs 16-bit

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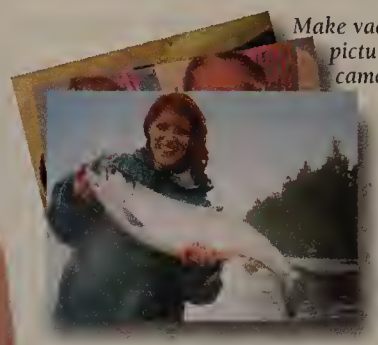

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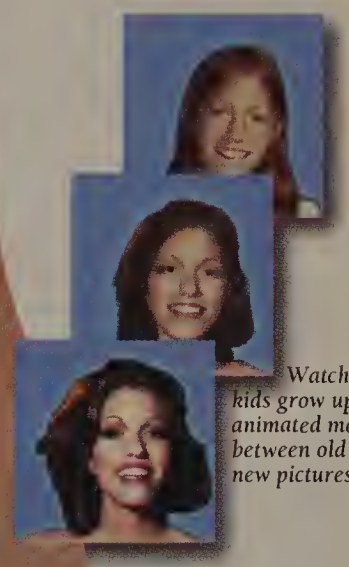

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code slower than the Pentium. (This slowdown also occurs with Win 95, since it contains enough 16-bit code to drag things down.) If you use UNIX or Windows NT, a Pentium Pro might be worth considering, but even Intel admits that it won't be a mainstream product until 1997.

For now, a 133-MHz Pentium motherboard is your best bet. Get a quality board from a reputable vendor such as Micronics. For more on motherboard swaps, see "Best Upgrades for Your 486," November 1995.

Splitting Power

Q I have a 486 with two floppies, two hard drives, and a CD-ROM drive. Unfortunately, it has only four power connectors inside, so only four drives can run (I leave my 5¼-inch floppy unpowered until I need to use it). Is it safe to split one of the power cords so I can connect the fifth drive?
Blair Hotchkies, Clinton, New York

A Yes, it's safe to split a power cord using a Y-connector, available for a few bucks at computer stores. Obviously, observe normal safety precautions. Chances are you'll never run all your drives at once, which could overburden your power supply. You could also buy a combination drive, which accepts both 5¼-inch and 3½-inch floppies.

The Pentium Conspiracy

Q I'd love to upgrade my 486DX2-66 to a Pentium, but not if I have to discard hundreds of dollars worth of 30-pin SIMMs and a VL bus graphics card and hard disk controller. All I see are Pentium motherboards with PCI buses and 72-pin SIMMs. Are 30-pin SIMMs and the VL bus incompatible with the Pentium, or is this a conspiracy forcing us to buy new components?
David Moroder, Internet

A I enjoy a good conspiracy theory as much as the next guy, but here the explanation is simple. The VL bus runs at the same clock speed as the motherboard. In a 486, that never rises above 50 MHz, the top speed of VL cards. Most Pentiums are 60 or 66 MHz, too fast for VL cards.

When it comes to 30-pin versus 72-pin SIMMs, it all boils down to convenience and space. The Pentium has a 64-bit data bus, but 30-pin SIMMs are only 8 bits wide. That means adding 30-pin SIMMs eight at a time, whereas 72-pin SIMMs, which are 32 bits wide, can be added two at a time. No designer is going to give up space for 16 30-pin SIMM sockets. And if there were only 8 30-pin sockets, your next step up from 8MB would be 32MB (in 4MB SIMMs), and you'd have to throw out the original eight 1MB SIMMs.

Ready for more planned obsolescence? Expect to see 168-pin DIMMs (dual inline memory modules). They're 64 bits wide and will give Pentium users ultimate flexibility—you can add them one at a time, and they'll come in many capacities.

By Eric Knorr

Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Hardware *welcomes your questions and pays $50 for published items. See page 14 for contact information.* ■

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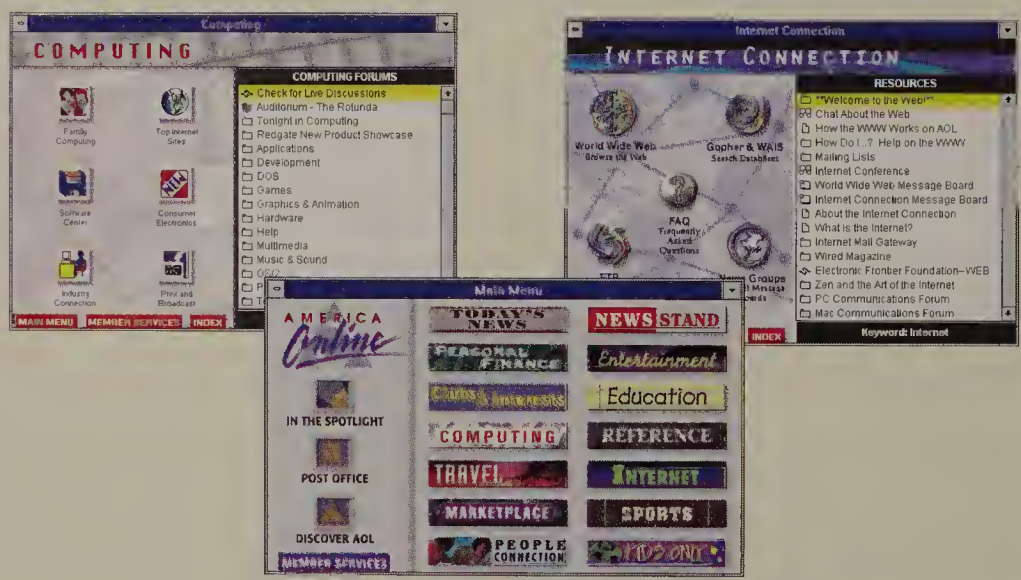

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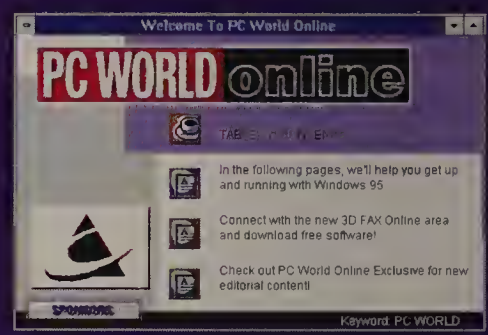

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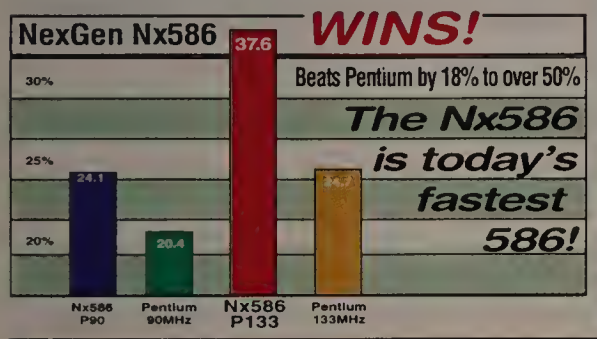

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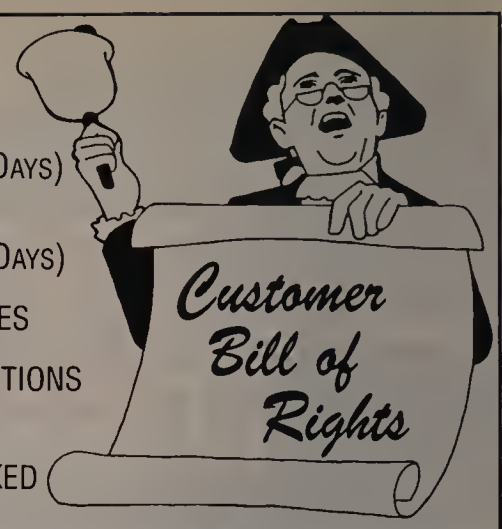

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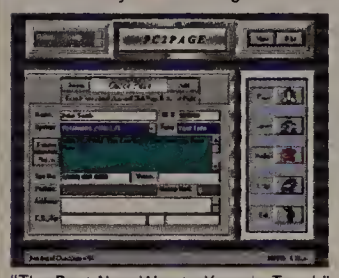

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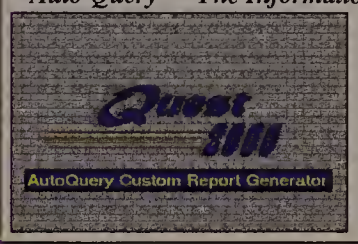

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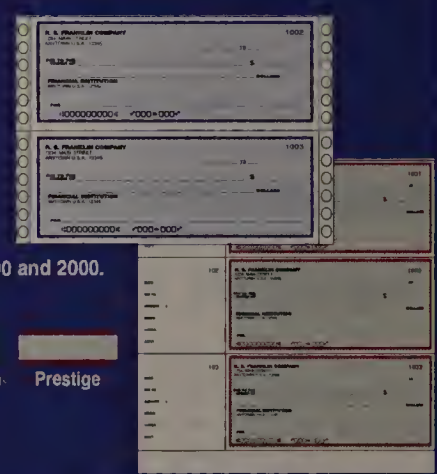

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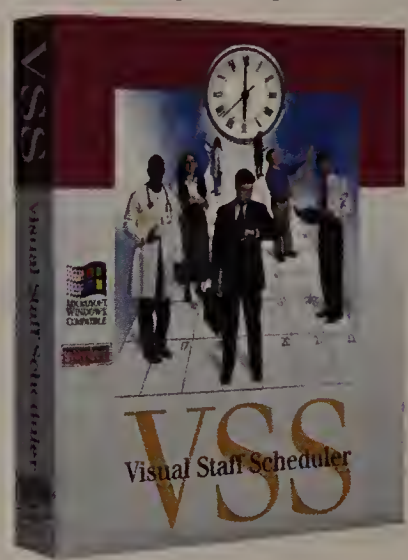

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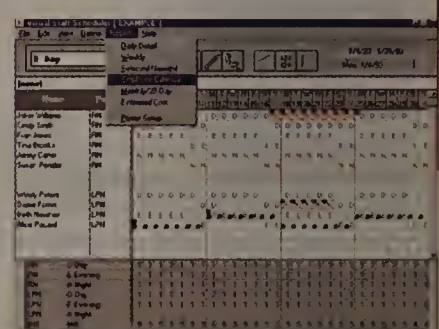

The 28-day worksheet design provides a clear & comprehensive view.

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Build Washboard Abs

New BodyCraft Software Delivers On Promises

Computer generated plans deliver washboard abs with a lot less effort and a lot more fun!

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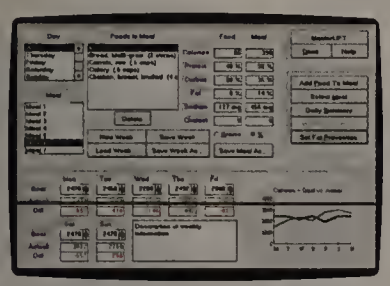
Done exactly as specified the BodyCraft Software program will cut-up your abs so fast you won't believe it. *You'll burn 2.2 pounds of fat off your waistline per week*--while building abdominal muscle. You'll see immediate results--Guaranteed.

COMPUTER SOFTWARE: No book or video can give what BodyCraft Software gives you--Personalized Printed Plans to



By carefully planning every aspect of your transformation, BodyCraft will help you achieve a strong, lean physique!

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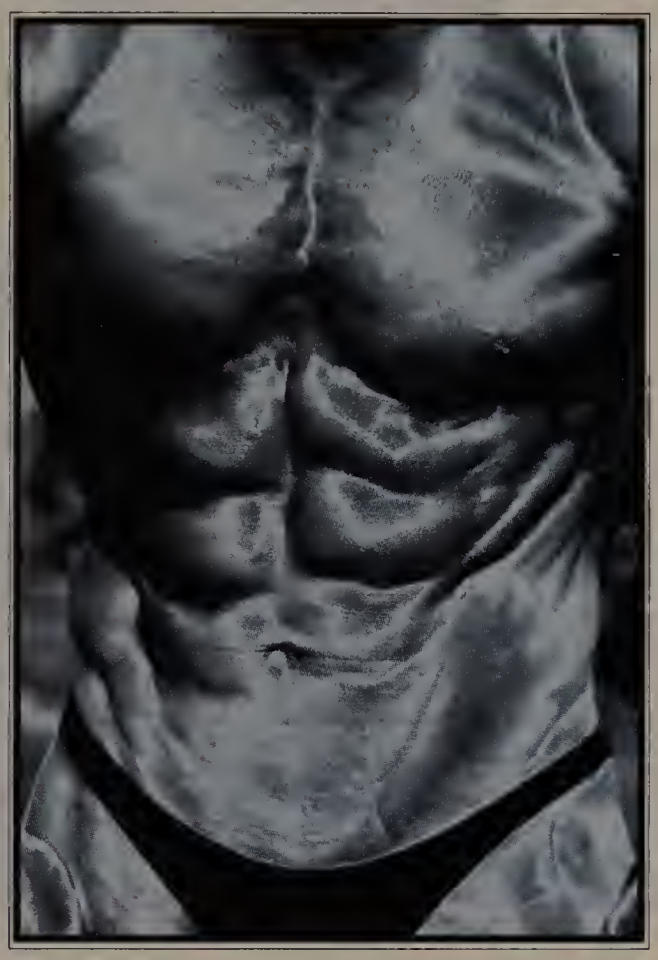

BodyCraft Software delivers "computer generated" plans for you to build your own washboard abs!

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No major changes in your life needed. You do not need to join a health club. Ab exercises can be done at home.

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Try this software. It will bring you washboard abs.

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If the software succeeds, you will have sexy, washboard abs. If it fails...*you have bought nothing.*

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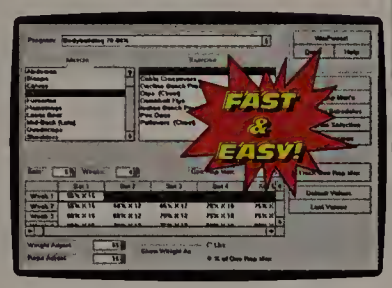

Following the right plan will make the difference between wasting your time...and achieving your dream physique!

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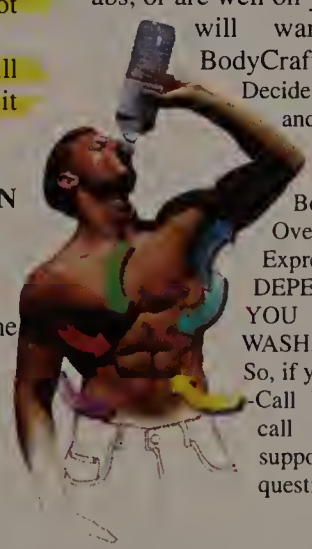

BodyCraft Software has been featured in dozens of magazines! Everyone loves it!

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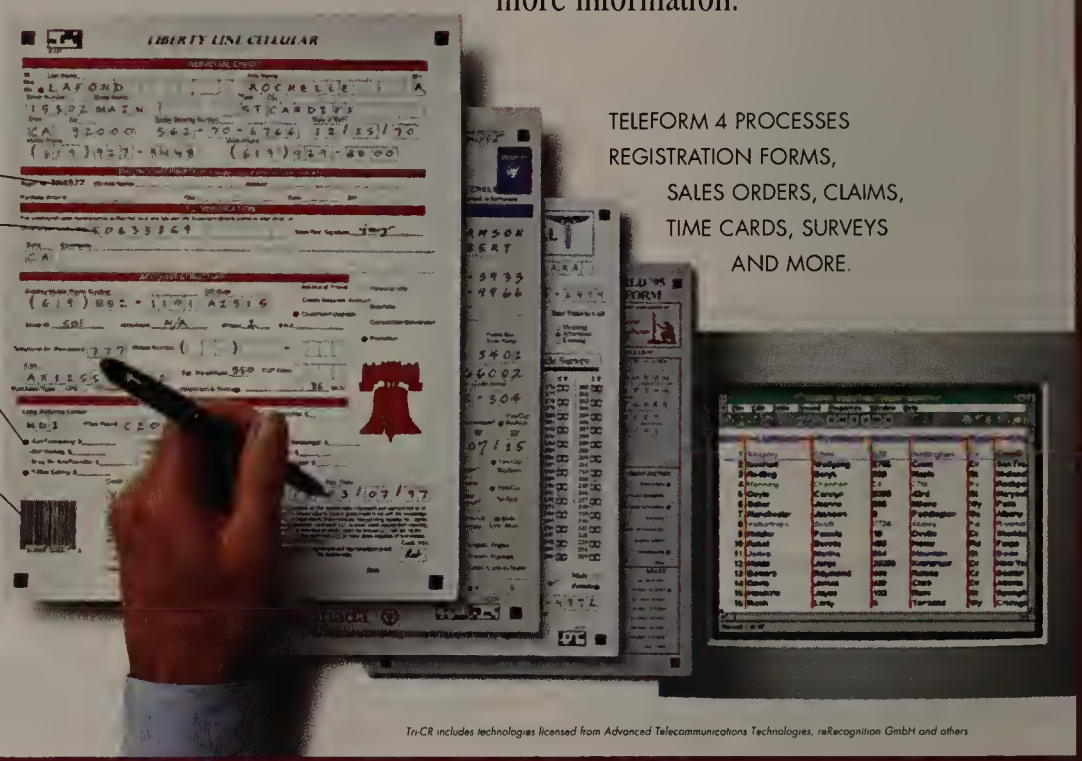

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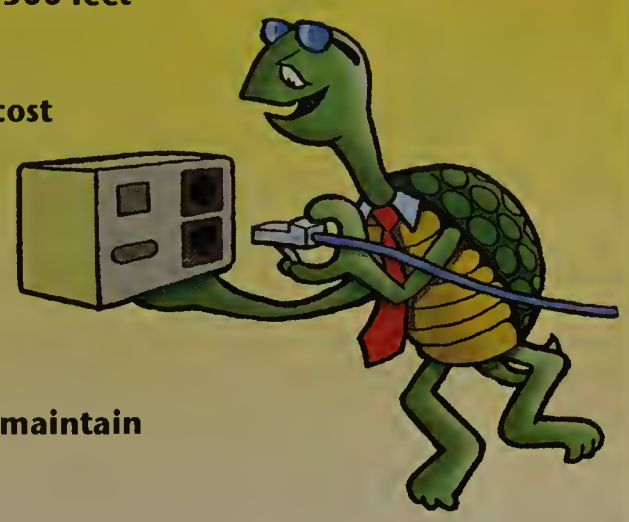

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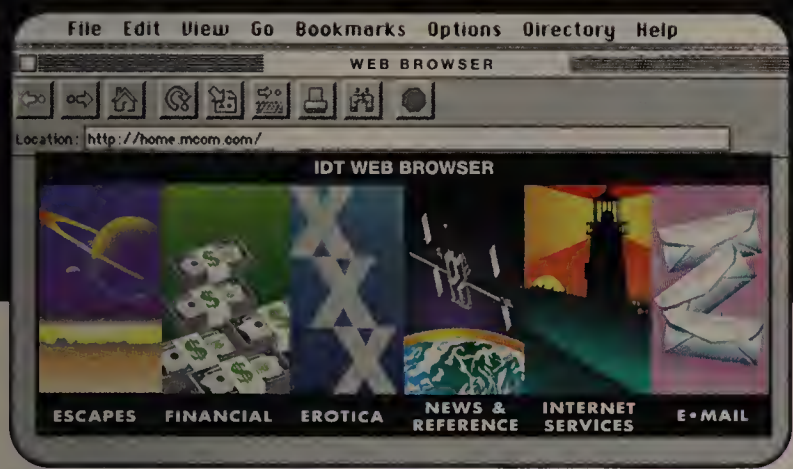

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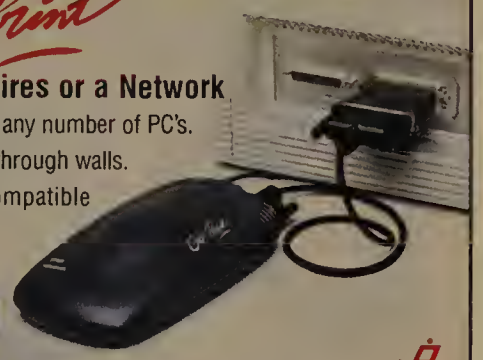

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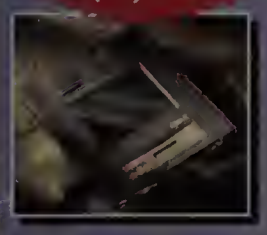

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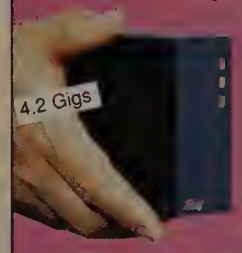

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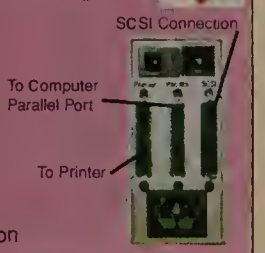

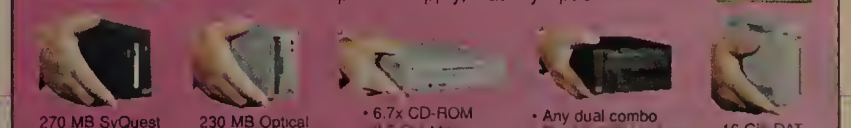

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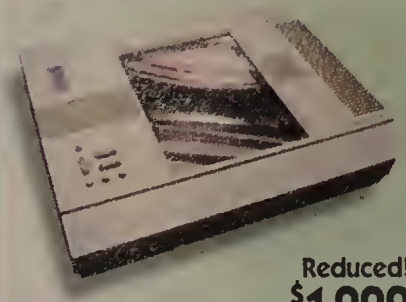

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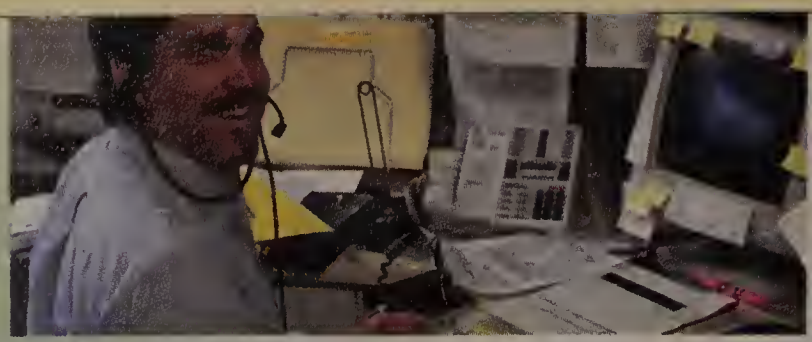

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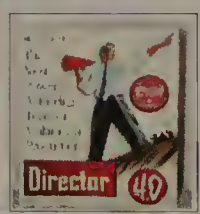

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HP II, IID:	—	90	168	—
HP IISI, 4, 4M, 4SI, XL300, DJ1200C	—	84	148	288
HP 4L:	47	—	—	—
HP DJ 500 Series (256K)	39	—	—	—
HP 4P, 4MP, Color LJ	—	89	164	—
HP Design Jet 5P	—	169	329	—
OKI 400:	—	94	—	—
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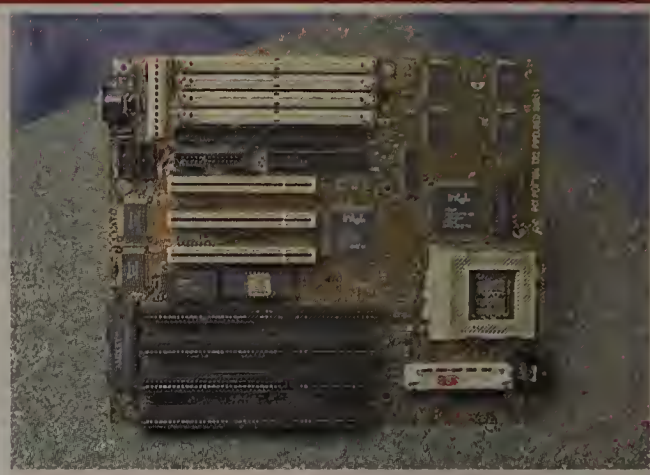

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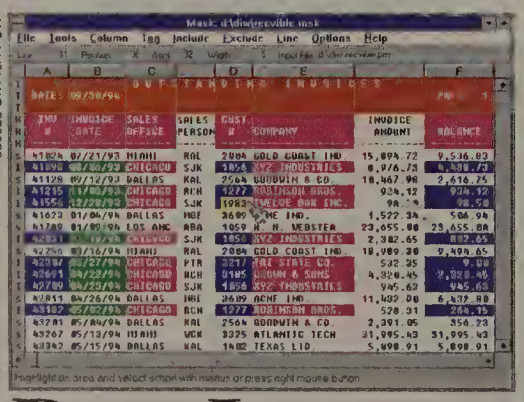

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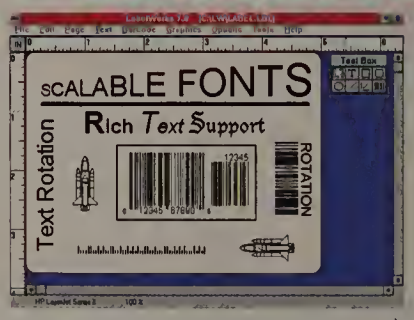

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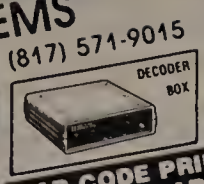

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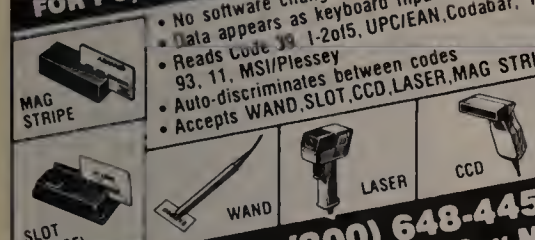

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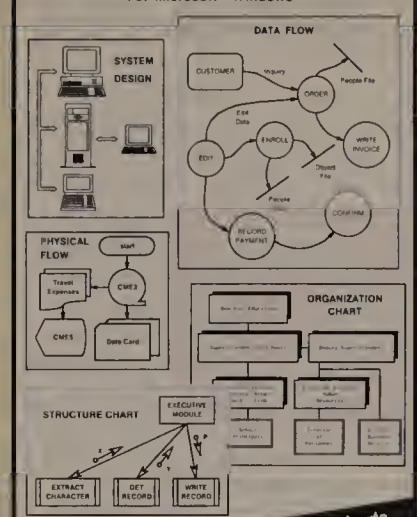

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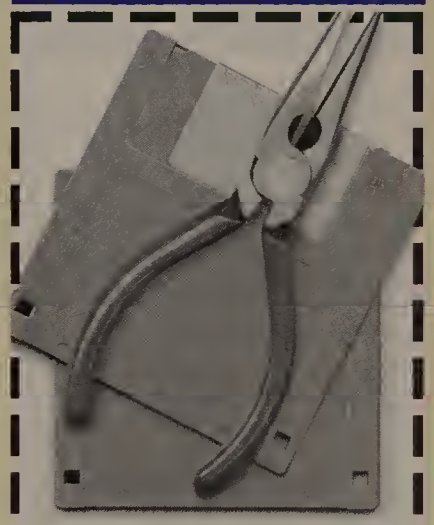

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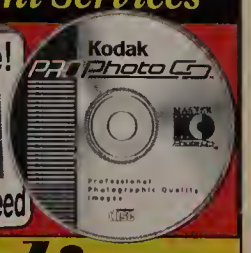

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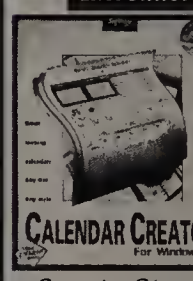

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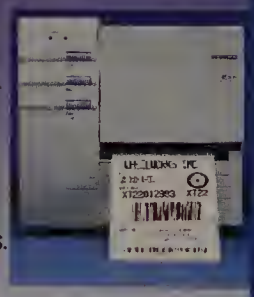

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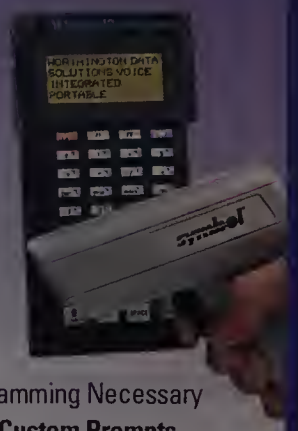

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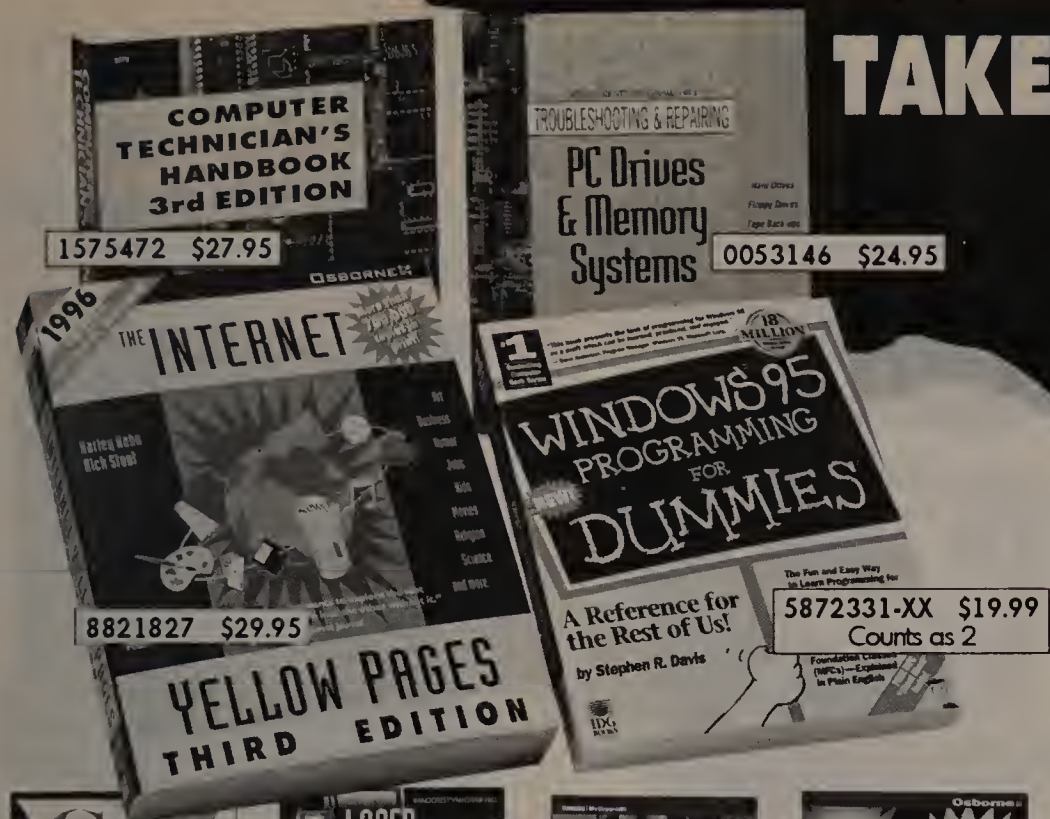

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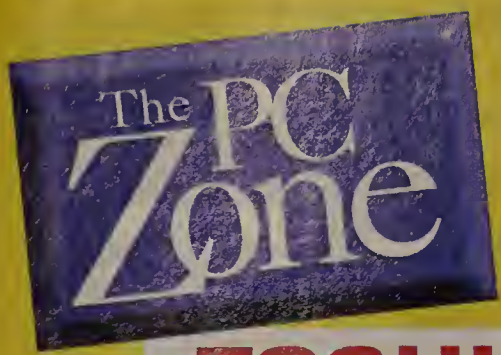

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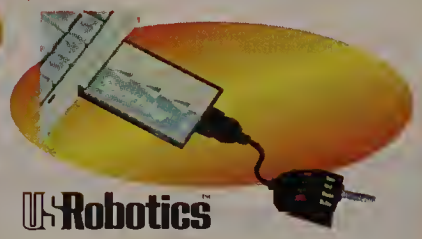

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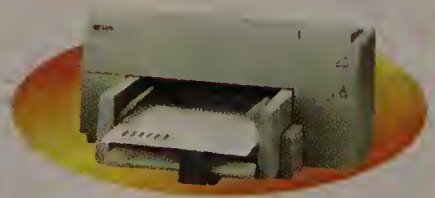

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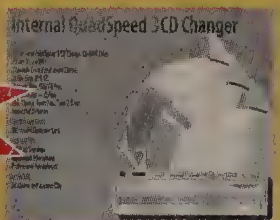

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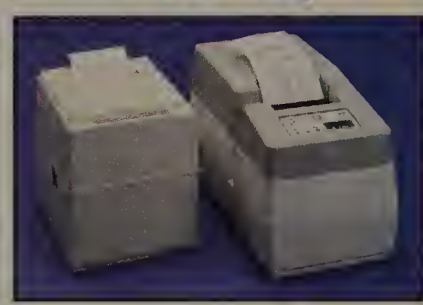

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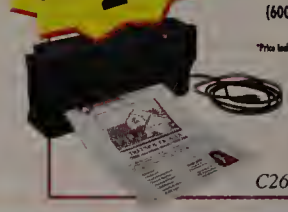

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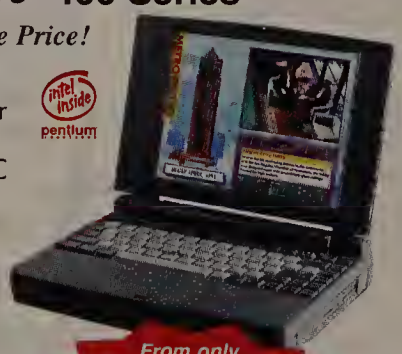

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Microsoft Office 4.x/95 Combinations	Call
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Publisher 2.0 - Basics/Power Tools	(ea) $49.95
PowerPoint 3.0/4.0 - Beg/Int/Adv	(ea) $49.95
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GroupWise 4.1 - Admin - Level 1/2	(ea) $89.95
InfoCentral 1.1	$49.95
Netware 4.1 - Level 1-7	(ea) $89.95
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WordPerfect 6.0/6.1 - Beg/Int/Adv	(ea) $49.95

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dBase 5.0 - Beg/Int/Adv	(ea) $49.95
PageMaker 5.0 - Beg/Int/Adv	(ea) $49.95
Paradox 4.5/5.0 - Beg/Int/Adv	(ea) $49.95
Peachtree 3.0 - Beg/Int/Adv	(ea) $49.95
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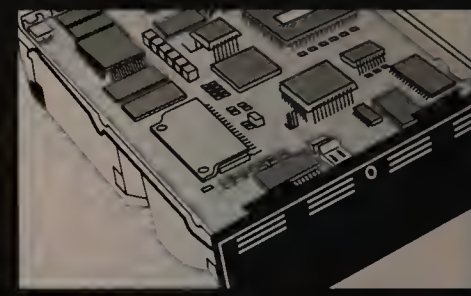

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1090MB	3yr	4500rpm	M1614T	$199
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2170MB	5yr	7200rpm	M2932S	$589
4350MB	5yr	7200rpm	M2934S	$899
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9100MB	12ms	MC1991	$1999
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2000MB	8.5ms	MC4221AV	$719
4294MB	8ms	MC3243AV	$1059
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WIDE SCSI			
2050MB	8.5ms	MC4221W	$759
4294MB	8ms	MC3243W	$1079
9100MB	12ms	MC1991W	$2099
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2000MB	8.5ms	MC4221WAV	$809
4294MB	8ms	MC3243WAV	$1139
9100MB	12ms	MC1991WAV	$2199

Seagate

IDE			
635MB	14ms	ST3630A	$185
850MB	11ms	ST5850A	$199
1080MB	11ms	ST51080A	$225
1625MB	10ms	ST31640A	$359
2167MB	10ms	ST32140A	$389
SCSI			
1052MB	9ms	ST31231N	$345
1080MB	12.5ms	ST51080N	$289
2147MB	9ms	ST32430N	$639
2147MB	8ms	ST32550N	$699
4290MB	9ms	ST15230N	$925
4290MB	8ms	ST15150N	$1159
9080MB	11ms	ST410800N	$2099
WIDE SCSI			
2147MB	8ms	ST32550W	$849
4290MB	8ms	ST15150W	$1219

HARD DRIVES

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SCSI			
850MB	14ms	TB850S	$195
1050MB	12ms	FB1080S	$265
2150MB	8ms	XP32150	$735
2216MB	8.5ms	VP32210	$635
4300MB	8.6ms	XP34301	$999

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NEC	CDR512	6X	150ms	$315
Plextor	PX63CS	6X	145ms	$375
Toshiba	XM3701	6.7X	120ms	$345
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Mitsumi	CRMCFX400	4X	230ms	$139
Toshiba	XM5302A	4X	190ms	$149
Teac	CD56E	6X	110ms	$199
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Seven drives in a single enclosure.

Sanyo 4X	$1629	NEC 4X	$2129
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1-21 drive models, & other mechanisms available.

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Save $10 on tape drive with hard drive purchase!
All prices include 1 FREE TAPE, cable, software.

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1.7Gig	$219	n/a	1360MB	$269	n/a

-SCSI Kit includes 16bit card & 1 tape.

			Bare	Kit
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2Gig	Conner	C4320RT	$789	$879
2-4Gig	Tandberg	3700	$389	$479
2-4Gig	Conner	TSM4000	$399	$469
2-4Gig	Conner	C4324RT	$849	$939
2-4Gig	HP	C1536A	$809	$899
4-8Gig	Conner	C4326NP	$929	$1019
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7-14Gig	Exabyte	8505XL	$1879	$1969

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TEKRAM		
DC280E, 4 drive Enhanced VESA, 2 16550 serial ports, 1 EPP parallel port, 1 game port	$60	$50

IDE and SCSI caching controllers - Call.

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ADAPTEC (Save $10 with Hard Drive purchase)	
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ISA A1542 Bare / Kit	$195 / $249
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VESA A2842 Kit	$249
PCI A2940Kit	$259
PCI A2940W Wide SCSI Kit	$309

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Processor	RAM/HD	CD-ROM	Price
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Pentium 100	BMB/1GB	4X	1999
Pentium 100	16MB/1.6GB	4X	2499
Pentium 120	16MB/1.6GB	4X	2699
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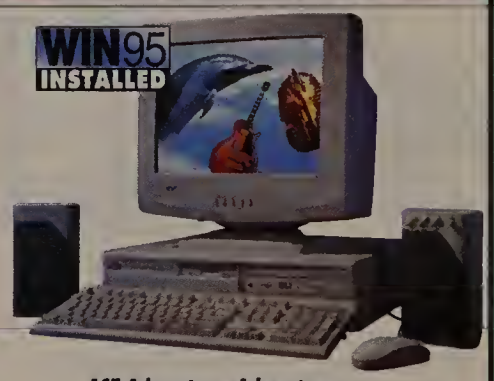
Pentium 75	B/850MB	4X	$1450*
Pentium 100	16MB/1.2GB	6X	1900
Pentium 133	16MB/1.2GB	6X	2140
Pentium 150	16MB/1.6GB	6X+	2400
Pentium 100	16MB/1.2GB	6X	2000
Pentium 133	16MB/1.6GB	6X+	2400
Pentium 150	16MB/2.1GB	6X+	2680
Pentium 166	16MB/2.1GB	6X+	3150

*4X CD-ROM, +w/3disc CD changer, Monitors priced separately



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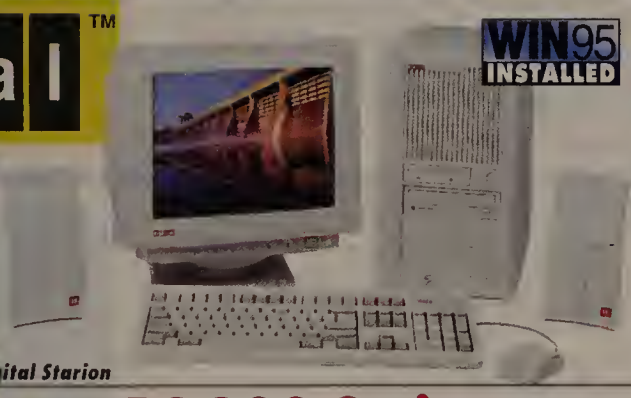

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- Unbelievable sound - SoundBlaster Pro-compatible, SW WaveTable, Premium JBL speaker system
- 28.8 fax modem and advanced telephony features (differs by model)
- Loads of **FREE** software preinstalled

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Processor	RAM/HD	CD-ROM	Price
Pentium 75	BMB/1.2GB	4X	$1799
Pentium 100	BMB/1.2GB	4X	1999
Pentium 100	16MB/1.6GB	4X	2499
Pentium 120	16MB/1.6GB	4X	2699
Pentium 133	16MB/1.6GB	4X	2899

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Pentium 75	B/540MB	5/5	1679
Pentium 90	B/540MB	3/3	1794
Pentium 90	B/540MB	5/5	1852
Pentium 100	16/540MB	3/3	2139
Pentium 100	16/540MB	5/5	2197

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HP DeskJet 660C printer C2164A 389.99

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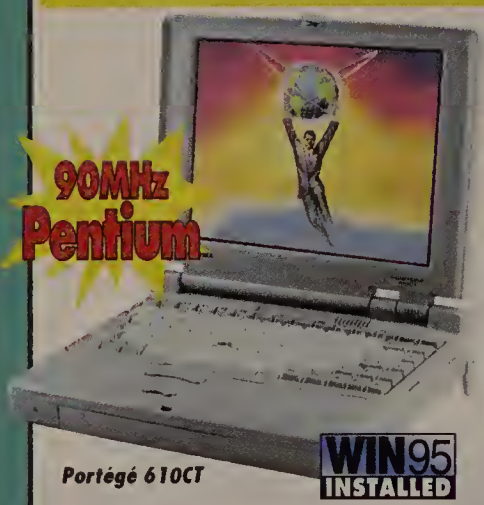

Portégé 610CT

Portégé 610CT

- Pentium 90MHz processor
- 9.5" True Color display for optimum color
- Built-in 16-bit sound (SoundBlaster Pro compatible), microphone & speaker
- Lithium Ion battery technology
- Accupoint stick for easy control

Processor	Screen	RAM/HD	Price
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Tecra 700

120MHz Pentium with PCI bus

WIN95 INSTALLED

- Pentium 120MHz processor – fastest available on a notebook!
- PCI bus architecture (internal & external)
- 11.3", 800x600 high resolution displays
- Optional 4X CD-ROM Drive (swap floppy & CD-ROM)
- Multimedia docking station with PCI bus (optional accessory, priced separately)
- Built-in 16-bit sound, microphone, **2 speakers** & MIDI
- **HUGE**, 1.13GB hard drives

Processor	Screen	RAM/HD	Price
Pentium 120	11.3" Dual Scan	8MB/1.13GB	$4679
Pentium 120	11.3" Active	16MB/1.13GB	5949

Tecra 700

Satellite Pro 410

Satellite Pro 410

- Built-in 4X CD-ROM Drive (Swap floppy & CD-ROM) (Active models only - optional on Dual Scan)
- Built-in 16-bit sound, microphone, speaker & MIDI
- EDO RAM memory, exp. to 40MB
- Built-in AC adapter - small, sleek design & reduced weight
- Integrated Accupoint - small, accurate & easy to use
- Lithium Ion battery technology
- Built-in infrared for wireless communications

Processor	Screen	RAM/HD	Price
Pentium 90	11.3" Dual Scan	8/772MB	$3499
Pentium 90	11.3" Active	8/772MB	4679

Satellite 2130CS/100CS

Satellite 2130CS/100CS

Processor	Screen	RAM/HD	Price
486DX4/75	10.4" Dual Scan	8/500MB	$1969
Pentium 75	10.4" Dual Scan	8/500MB	CALL*

*EDO RAM

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ThinkPad® 365

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- Built-in infrared for no-hassle printer connections
- Multimedia models include built-in 2X CD-ROM, SoundBlaster compatible audio, speaker, microphone & MIDI/joystick port
- MS Windows 95 or Selecta System models available

Processor	Screen	RAM/HD	Price
486DX4/75	10.4" Dual Scan	8/540MB	$1999
486DX4/75	10.4" Active	8/540MB	2599
486DX4/75	10.4" Dual Scan	8/540MB	2499*
486DX4/75	10.4" Active	8/540MB	3099*

*Multimedia Models

ThinkPad® 760

- Up to 120Mhz Pentium with 32-bit local bus
- 12.1" Active displays with 800x600 resolution (selected models)
- 4X CD-ROM Drive, MPEG-2 support, & full motion video (ThinkPad760CD only *)
- Built-in 28.8 fax/modem
- SoundBlaster-compatible audio & telephony
- Lithium Ion battery technology

Processor	Screen	RAM/HD	Price
Pentium 90	10.4" Active	8/720MB	$5349
Pentium 90	12.1" Active	8/720MB	6049
Pentium 120	12.1" Active	8/720MB	6599
Pentium 90	12.1" Active	8MB/1.2GB	7449*

*Features built-in CD-ROM drive
WIN 95 models available. Call for details.

ThinkPad® 760

NEC

Versa 2000

Processor	Screen	RAM/HD	Price
486DX4/75	9.5" Active	4/350MB	$2099*
486DX4/75	9.5" Active	8/350MB	2399
486DX4/75	9.5" Active	8/540MB	2599

*14.4 fax/modem not built-in

NEC Versa 4000

NEC Versa 4000

- Built-in CD-ROM Drive! (Standard on some models, optional on others)
- Up to 120MHz Pentium processors
- 256KB Level 2 Cache to optimize performance
- Unbelievable displays – 65K color Dual Scan, 16.8 million color Active (High resolution Active Matrix displays available – 800x600 res.)
- Built-in 16-bit sound, microphone, MIDI and **2 built-in speakers**
- Multimedia docking station with outstanding Altec Lansing 4 speaker array (optional accessory, priced separately)

NEW 120MHz Pentium Model!

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	8/540MB	$3499
Pentium 75	10.4" Dual Scan	8/540MB	3799*
Pentium 75	10.1" Active	8/540MB	3999
Pentium 90	10.1" Active	8/810MB	4649*
Pentium 90	10.4" High Res.	8/810MB	4799
Pentium 120	10.4" High Res.	8MB/1GB	5499

* Features built-in CD-ROM drive

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486DX2/50	9.5" Active	8/340MB	3079
486DX4/75	9.5" Active	8/340MB	3319
486DX4/75	9.5" Dual Scan	8/528MB	3079
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WIN95 INSTALLED

Processor	Screen	RAM/HD	Price
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Pentium 75	11.3" Dual Scan	8/810MB	4439
Pentium 75	10.4" Active	8/810MB	4729
Pentium 90	10.4" Active	8/810MB	5339
Pentium 90	10.4" Active	8/810MB	5599*
Pentium 120	10.4" Active	8MB/1.35GB	6149

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UP TO 120MHz PENTIUM with PCI BUS

LTE 5000

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- Built-in 16-bit sound, microphone & speaker
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- Built-in infrared for wireless communications

Processor	Screen	RAM/HD	Price
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75MHz Pentium with PCI BUS

Built-In CD-ROM

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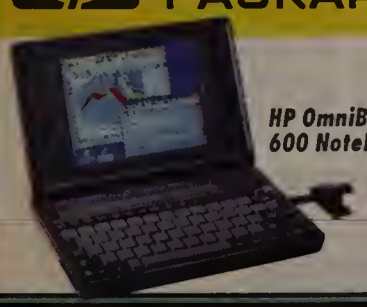

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HP OmniBook 600

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HP OmniBook 5000

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Processor	Screen	RAM/HD	Price
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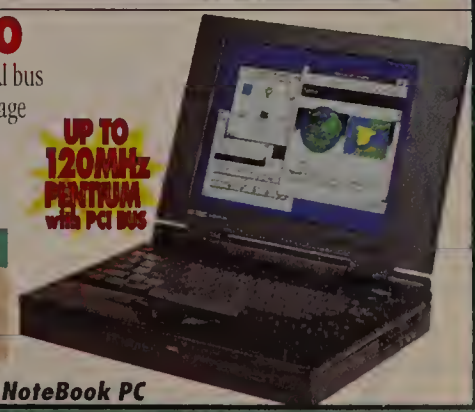
Pentium 120	10.4" Active	16MB/1.2GB	6539

UP TO 120MHz PENTIUM with PCI BUS



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952 Notebook computers
953 Windows 95 software
954 Monitors and video boards
955 Accounting software
956 Graphics software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
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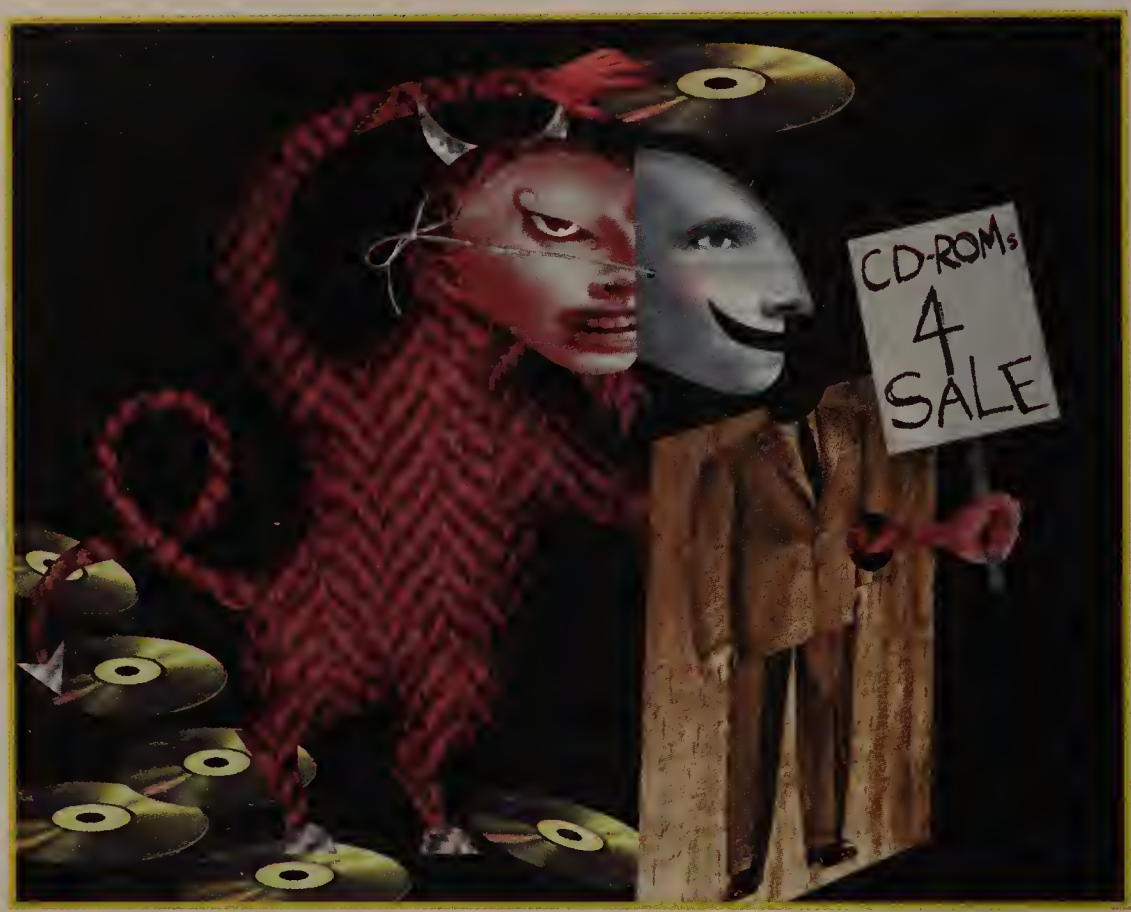


JOYCE HESSELBERTH

Consumer Watch

Counterfeiting Comes to CD-ROMs

BY ROBERTA FURGER

Think that CD-ROM encyclopedia you just bought at half off the list price is a great deal? Think again. It may be as phony as a three-dollar bill.

According to reports from two associations of U.S. software publishers, counterfeit CD-ROM titles—not long ago considered an "offshore" issue affecting primarily Southeast Asia and eastern Europe—have become a serious concern in the United States. "One year ago we weren't getting any reports of counterfeit CDs," says Peter Beruk, a spokesperson for the Software Publishers Association. Today such reports are fairly commonplace, and both the SPA and the Business Software Alliance have filed several lawsuits against suspected counterfeiters.

Counterfeiting has become a big business, says Kelly Jo MacArthur, general counsel and director of business affairs for Compton's New Media. Compton's has identified counterfeit copies of both its CD-ROM encyclopedia and its Doctor's Book of Home Remedies, a medical reference disc. Not surprisingly, the best-selling CD-ROMs are also the ones most likely to be counterfeited. Companies reporting counterfeiting of their discs include Broderbund, Intuit, Microsoft, Novell, Spectrum HoloByte, and id Software (the Doom folks).

Naturally, CD-ROM developers are worried about the potential for huge revenue loss, but the rise in counterfeiting raises some serious issues for consumers as well. Among the possible pitfalls of winding up with a counterfeit CD-ROM: poor performance, bugs, incomplete or nonexistent documentation, no technical support or upgrade deals, and the risk that a virus will infect your computer. Over the long haul, the rise in counterfeiting—and the resulting losses to software companies—might also force software vendors to spend less money on product development. That means fewer enhancements to existing products, and fewer new software applications and CD-ROM titles to choose from, says one company spokesperson, noting that smaller firms will be particularly hard hit. "It could put some companies out of business," he adds.

"Plus," says Beruk, "it's a crime." And the software police are cracking down. So far, only suspected counterfeiters and resellers of counterfeit CD-ROMs have been arrested, but no one is ruling out legal action against consumers who knowingly buy illegal copies of software and CD-ROMs.

GOOD IMITATIONS

It's not always easy to tell a legitimate copy from a counterfeit one, even if you thoroughly examine the disc before buying it. Not only are counterfeiters getting better at replicating product packaging, but in some instances they're even able to copy the holograms or certificates of authenticity that come with DOS and Windows, two frequently counterfeited products. (Microsoft corporate attorney Anne M. Murphy says the company hasn't yet seen any counterfeits of either the Windows 95 or Microsoft Office for Windows 95 certificates of authenticity, however.)

Complicating matters is the way these products are sold: right alongside legitimate copies, everywhere from flea markets and computer fairs to retail stores.

According to Murphy, well over half the software titles and CD-ROMs sold at computer fairs and flea markets are counterfeit. "You might find a reseller selling overstock of legitimate products," she concedes, "but the overwhelming majority of the goods are counterfeit."

As for retail stores, neither the SPA nor the Business Software Alliance has a good handle on how widespread the resale of counterfeit goods is—but for the first time, both groups are involved in lawsuits that include both distributors and retailers of software. Most experts in the industry agree that consumers are fairly safe buying CD-ROMs from large national chains, but they say the chances of getting an illegal copy increase when you buy from mom-and-pop stores. "They're more vulnerable to the economic pressures," says Bob Kruger, BSA director of enforcement.

To complicate matters further, some retailers are mixing legitimate copies of products with counterfeit versions.

Though counterfeit goods might show up more frequently at small, single-location stores, consumers shouldn't stop shopping at those establishments. What you should do, however, is keep a wary eye out for deals that seem too good to be true. Kruger is also quick to point out that retailers themselves may not know they're selling counterfeit goods, particularly when the CD-ROMs are in one of the popular ten-packs of top CD-ROMs that include legitimate discs from many leading publishers.

In an effort to curb the distribution of illegal software and CD-ROMs, the BSA is launching a campaign in early 1996 to authorize software resellers as BSA Approved Software Dealers. To qualify for this designation, dealers will be required to sign a Code of Ethics, in which they pledge not to resell counterfeit CD-ROM titles. The BSA will distribute posters and other materials that stores can post to let customers know of their participation in the program. It will take some time, though, before a significant number of dealers are on board.

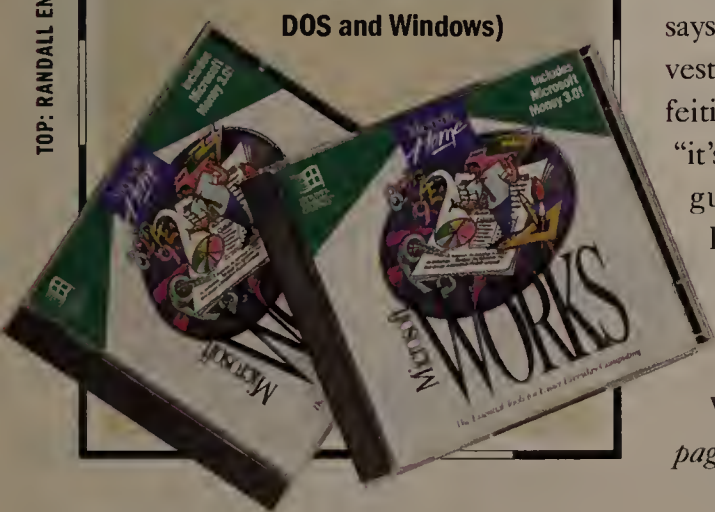
Most publishers believe the problem will get worse before it gets better, given the growing popularity of multimedia titles and the rapid drop in the cost of CD-ROM duplication equipment. (A duplicator is as little as $999 at many office supply stores.) "Given the low cost of materials," says the SPA's Beruk, "it's a pretty easy investment." And, since CD-ROM counterfeiting is usually handled as a civil action, "it's a lot safer than dealing in drugs or guns," says Beruk. "You won't have the Drug Enforcement Agency or the FBI knocking down your door."

As always, you can contact Consumer Watch *with questions or problems. See page 14 for contact information.*

CHECKING OUT THE GOODS

How can you tell a legitimate CD-ROM title from a counterfeit copy? It's not always easy, but here are some clues:

- **poor print quality on the package or on the disc**
- **smudged letters or misspellings in the package's text**
- **documentation that's incomplete or missing altogether**
- **blurred or off-center artwork on the box or jewel case**
- **no holographic seal on the spine of the packaging**
- **no certificate of authenticity (Microsoft ships one with every copy of DOS and Windows)**

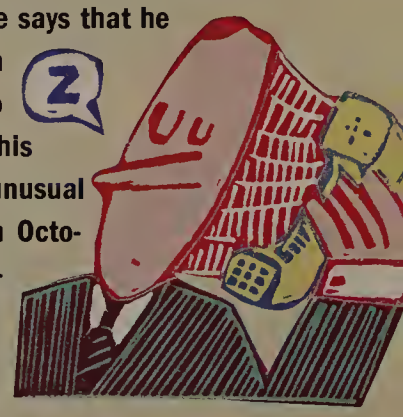


TOP: RANDALL ENOS; RIGHT: J.D. KING

Feedback

Where's the Service?

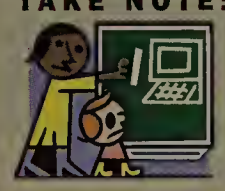
Brad Richter of New York wrote to tell us that our assessment of Dell's technical support is off the mark. Dell gets consistently high scores for service in our Top 20s, but Richter's experience differs. He says that he spent ages on hold and that no one returned his calls. This is unusual for Dell. But In October—when Richter was calling the company—our monthly Reliability and Service Monitor also showed a spike in Dell's hold times. We contacted Dell to see what happened. A spokesperson apologized for Richter's experience but could not confirm any pattern. She told us that there is always the possibility of an occasional long wait but that *average* hold times are on the decline.



Good Money Gone

Are you afraid to dial a tech support 900 line for fear of bankruptcy? Ken Pryor of Robinson, Illinois, called Sun Remarketing to ask a technical question about an old computer someone had given him. After he listened to a message telling him he'd be billed $2 a minute, the phone rang and rang but no one answered. Assuming he'd done something wrong, he retried the number. He never got through, but he did get his phone bill—with a $56 charge from Sun. We forwarded his letter to the company, which quickly gave him a refund and an apology. A technician had left a phone unattended but accepting calls. Sun has since changed the way it handles incoming calls. "As our warranty states, we are happy to refund any amount spent with our company for which the customer is not completely satisfied," explained Robert Cook, Sun CEO. "This certainly applies here."

TAKE NOTE: **94 percent of teachers think PCs are powerful teaching tools. But 24 percent of classrooms don't have even one.**



Source: The 1995 Tenth Planet Teachers and Technology Survey of 1000 K-6 U.S. schools.

Cybertoys for Everyone in the House

Printing on mugs, learning greed, youthful surfers

Print your own mug with the FotoFun printer.

DESKTOP DARKROOM

You're hip. You've got your photo collection on CD-ROM; you've removed the red from everyone's eyes and deleted your visibly drunk third cousin from the wedding photos. But you're still not happy—the printouts from your ink jet printer look amateurish. Enter the FotoFun Digital Color Photo Printer. Suddenly you're printing snapshots (slowly) right from your computer. The postcard-size snaps are nearly as good as those you get from your local film developer. And, get this, you can buy a kit that lets you transfer your snaps onto a coffee mug. The mugs look great. In fact, you'll never go gift shopping again. The downside, of course, is that all this will eat a big hole in your wallet. The printer costs $499.95, and the supplies are expensive: The film paper is $34.95 for 36 prints and a ribbon. The mug kit (which doesn't include paper—and you need it) is $29.95 for four mugs. —*Christina Wood*

- **FotoFun Digital Color Photo Printer** $499.95 list; Fargo Electronics; 800/327-4622, 612/941-9470. Grade: B
  Reader service no. 662

GREED IS GOOD

Do you have the insight of a Bill Gates? The power of a Leona Helmsley? The morals of a Gordon Gekko? Or wish you did? Forget that expensive MBA. Capitalism, an impressive new simulation CD-ROM from Interactive Magic, lets you learn the fundamentals of first-year business school on the job. As president of your own virtual company, you're responsible for everything from balance sheets to brand strategy. As you claw your way to the top, you'll face cutthroat competition while plying your skills in realistic business scenarios. Capitalism's friendly interface and excellent tutorials temper the game's complexity, but it's not for the casual player. It is, however, the cheapest way to learn that you don't need an MBA. —*Kirk Steers*

- **Capitalism** $59.95 list; Interactive Magic; 800/789-1534; 919/461-0722. Grade: A+
  Reader service no. 663

KID-SIZE SURFBOARD

Call it an Internet booster seat: CompuServe's Internet in a Box for Kids gives junior surfers everything they need to get on the Net. The kit starts with some of the usual software, including a World Wide Web browser (Spry Mosaic) and an e-mail program (Spry Mail). It also includes a utility for setting up Internet access via CompuServe and a free lifetime subscription to Surfwatch, one of the most popular utilities for keeping kids away from inappropriate sites. The kit comes with a subscription to Free Zone, a kids-only Web community that includes an e-mail pen pals sys-

TAKE NOTE: **Want to keep kids away from TV? 75 percent of parents say their kids watch less TV since they got a multimedia PC.**

Source: A survey of 1200 households by FIND/SVP and Grunwald Associates.

FEEDBACK CONTINUED

Into the Night

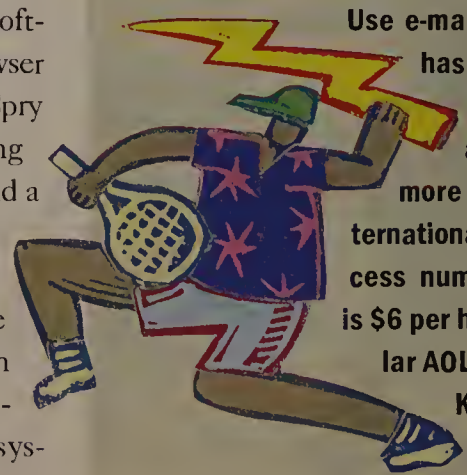
John Linn of Raleigh, North Carolina, wrote with a horror story about his experience with Angle Technologies (aka ATI or A.T. Inc.) in Sunnyvale, California. In response to an ad in the September issue of *PC World*, his company wrote a check to the mail-order computer vendor for a new system. He never received the computer, but the company cashed his check. We discovered that A.T. Inc. had closed its doors and disconnected its phones. Since the company has not filed for bankruptcy, Linn has little recourse. If the company had filed for bankruptcy, Linn would be among the first in line to collect whatever assets the company might have. If Linn had used a credit card instead of paying by check, his credit card company would probably credit his account. Remember: Never pay for mail-order goods with a check or cash—even if the company offers a cash discount.

Dining Out

Anyone who travels knows how dangerous it is to locate a restaurant in a new city. Now there's a World Wide Web site that can help. Check out Kerry's Restaurant World at http://www.kerrymenu.com/. You can search for restaurants in major cities by such criteria as price, cuisine type, and neighborhood. The listings are by no means comprehensive, but you can see the menu before you make a reservation.

Vacation E-Mail

Next time you go on vacation, you can make sure your missives get home before you do. Use e-mail. America Online has launched AOLglobalnet so you can access AOL from more than 140 cities internationally, using local access numbers. The charge is $6 per hour, plus the regular AOL connect charges. Keyword: access.



By Christina Wood

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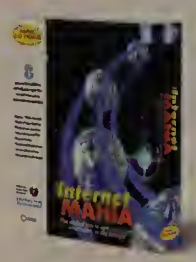

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tem, an online magazine, and a tool for building your own Web page. While some parents may prefer the ease of an online service such as AOL or Prodigy, IBK is great for kids who want nothing but Net. —*Dan Miller*

- **Internet In a Box for Kids** $29.95 street; Spry CompuServe Internet Division; 800/557-9614, 206/957-8000. Grade: B+
  Reader service no. 664

BONE-CRUSHING TACKLES

Quarterback Attack puts you in the middle of the action, with former Chicago Bears coach Mike Ditka barking orders. You're the quarterback, you call the plays, and you hit the turf when a defender flies in your face. The game uses video clips shot from the quarterback's point of view to simulate what it's like to line up behind the center, scan the defense, and deliver a perfect touchdown pass. Just keep an eye out for oncoming tacklers and be prepared to run. The game can be difficult to master, but with six skill levels you'll be able to work on different aspects of your game as you move through the ranks. It's a fun way to enjoy football on your computer. If you use Windows 95, it will run off your CD-ROM drive; otherwise it will load a DOS program on your hard drive. —*Brad Grimes*

- **Quarterback Attack With Mike Ditka** $43.95 list; Digital Pictures; 800/332-0032, 415/345-5300. Grade: A-
  Reader service no. 665

LOST IN THE WOODS

"Hansel—what will we do?" Gretel plaintively cries when you load Hansel & Gretel and the Enchanted Castle. You may soon echo her sentiments. Things start out promisingly enough. A narrator provides some background in case you've forgotten this classic fairy tale, while you take in panoramic views of the hapless kids' home turf. The presentation is beautifully cinematic, with rich animation and an appealing sound track. Unfortunately, as soon as the introduction ends, you're on your own: You're given no clue as to how to set up preferences, use the program's bilingual features, or even play the game. Once you find the options menu, you can select a primary and secondary language from English, French, Japanese, German, and Spanish. You can choose from two difficulty levels. The real challenge, though, isn't finding your way through the castle, but finding your way through the game. —*Anne Kandra*

- **Hansel & Gretel and the Enchanted Castle** $49.95 street; TerraGlyph; 800/929-9844, 847/781-4100. Grade: C
  Reader service no. 666

Explore a grim mansion in The 11th Hour.

DIABOLICAL HORRORS

Like any sequel, this belated follow-up to the CD-ROM best-seller The Seventh Guest is meant to outshine its predecessor. But like The Seventh Guest, The 11th Hour is schizophrenic. It includes a 65-minute plot-driven, shot-on-location video with actors cast from the Oregon Shakespeare Festival. But it also has 19 difficult brainteasers and more than 42 objects to collect before the entire video is played out. The game arrives on four discs that must be shuffled often. But the video is engrossing and plays at a TV-like 30 frames per second. The game is your basic explore-the-haunted-mansion setup; you appease your curiosity about new rooms only after solving a puzzle. —*Michael S. Lasky*

- **The 11th Hour** $70 list; Trilobyte, Inc.; 714/752-3730. Grade: A-
  Reader service no. 667

FIX PHOTOS WITHOUT FUSS

Working with pictures on your PC should be fun, not an ordeal. But most professional photo editing programs are a bear to learn, and most low-end versions are lame. My advice? Check out Adobe PhotoDeluxe. This CD-ROM–based image editor works with all Windows platforms and is built with the same tools used by Adobe Photoshop. PhotoDeluxe walks you through fancy tricks. Remove that evil red glow in your kids' eyes; fix old photos; or paint, twist, and blend shots into greeting cards and calendars. You can also skip the hand-holding mode and go at it solo. There's even a QuickTime tutorial to show you around the block, and a slide show and screen saver to show off your stuff. One quibble: You can't undo mistakes after more than one step. —*John Goddard*

- **Adobe PhotoDeluxe 1.0** $89 street; Adobe Systems Inc.; 800/888-6293, 415/961-4400. Grade: A-
  Reader service no. 668

THE FAMILY ROOM

The Net is trying its darnedest to get family-friendly. First came software that allowed parents to block risqué sites. Now we're seeing family-specific Web sites. One of the best is Starwave's Family Planet (**http://family.starwave.com**). On the site's opening page, you'll find links to news (including The Flu Report), reviews of toys, software, and books, and age-specific guidance. The product reviews come from well-regarded third-party publishers, including The Oppenheim Toy Portfolio and The Parents' Resource Almanac, the advice from such respected experts on children as Penelope Leach and Jan Faull. —*Dan Miller*

- **Family Planet** free; Starwave; **http://www.starwave.com**. Grade: A
  Reader service no. 669

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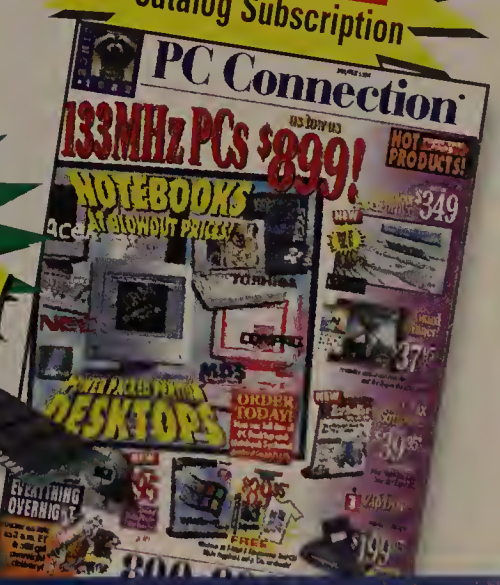

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Pass the PC, Please

What to do when the whole family shares a computer

BY LINCOLN SPECTOR

There are three people and four PCs in my house, yet we still fight over the computer. You see, two of our systems are too antiquated for real use (my son actually took one to school for an assignment on historical artifacts), and a third lacks a modem and a CD-ROM drive, rendering it unsuitable for children—or even fun-loving adults.

That means one computer gets heavy use. Aside from the time-sharing problems (I can't go to the bathroom without someone eagerly asking if I'm off the PC), this really messes up our work habits. We all use different applications and have unique styles for arranging our desktops. We don't even agree on our wallpaper.

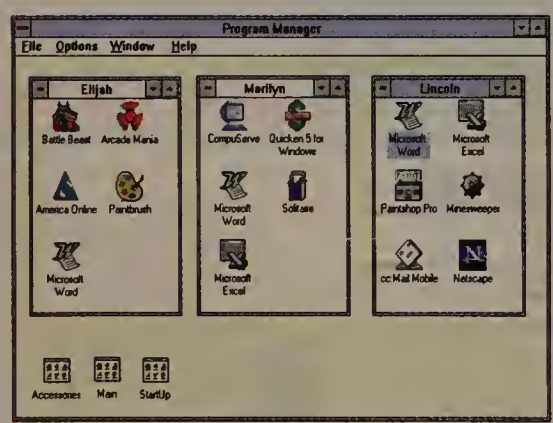
CONFIGURE TO TASTE

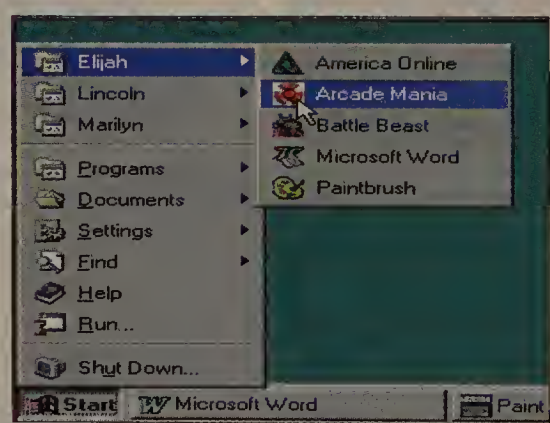
Imagine this: You launch Windows, entering your name and a password. Windows automatically launches only the programs *you* want it to start up. The only Shortcuts on the desktop are the ones you put there (or the ones Microsoft put there that you can't get off). You even use that wallpaper your spouse can't stand. When other people enter Windows, they get their options.

If you're using Windows 95, this is amazingly easy to set up via Control Panel's *Passwords* icon. Click the *User Profiles* tab and select the second option, *Users can customize their preferences and settings.* Check both boxes under User Profile Settings. Click *OK*, and let Windows reboot.

When you reboot, you'll be prompted for a name and a password. When you want to set up another person on the computer, just enter another name and password.

There's nothing like this in Windows 3.*x*. Oh, you can write a batch file that copies certain files back and forth before and after you enter Windows, but it's probably easier just to put up with the Barney wallpaper.





You may not be able to afford separate computers, but without spending a cent you can give everyone in the family their own place to launch programs.

A GROUP FOR EVERYONE

If your family needs aren't extensive, you might simply give everyone a specific place for launching programs—something you can do in any version of Windows. That way, when your little Kimberly wants to play Doom, she won't accidentally launch Quicken and find out just how broke her parents really are.

If you're running Windows 3.*x*, you should give each PC user their own Program Manager group: Select *File•New* from within Program Manager, make sure the *Program Group* radio button is selected, and click *OK*. In the resulting dialog box, enter the person's name as the Description, leave the Group file name blank, and press **<Enter>**. To move programs from other Program Manager groups into this one, simply drag them; to copy the programs, **<Ctrl>**-drag them. (You can also drag files from File Manager into this group for launching.) Repeat for your entire family.

If you're using Windows 95, you can add a menu for each family member to the Start menu. Right-click *Start* and select *Explore* to bring up Explorer in your Windows\Start Menu folder. Then select *File•New•Folder*, type in the name of someone you love, and press **<Enter>**. To move programs to the new menu, find the Shortcuts for them in Explorer and drag the Shortcuts to the new folder (remember, if the option is on the Start•Programs menu, the Shortcut will be in the Windows\Start Menu\Programs folder). To copy the Shortcuts instead, **<Ctrl>**-drag them.

Once you've set up these groups properly, you can launch your own applications without even looking at your family's programs. Just don't leave the computer while a large application is loading—you may never get it back.

Lincoln Spector is a senior associate editor for PC World. *See page 14 for contact information.*

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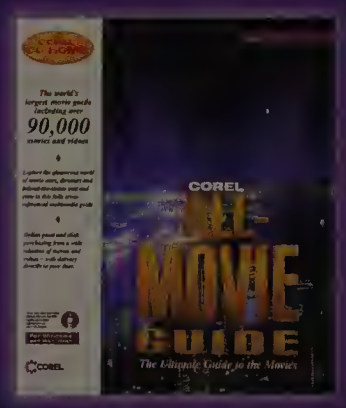

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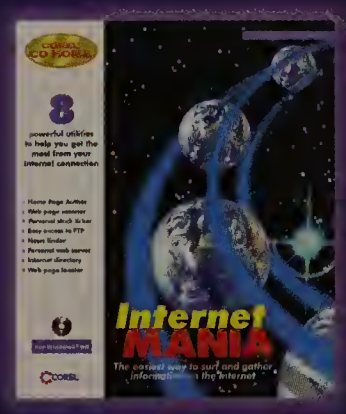

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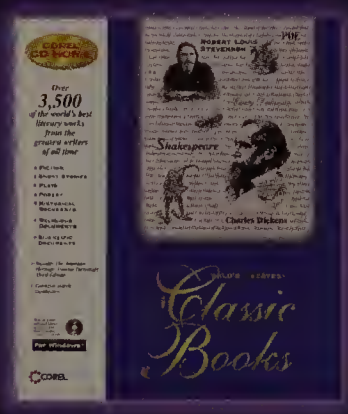

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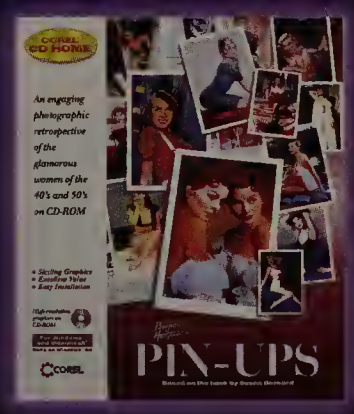

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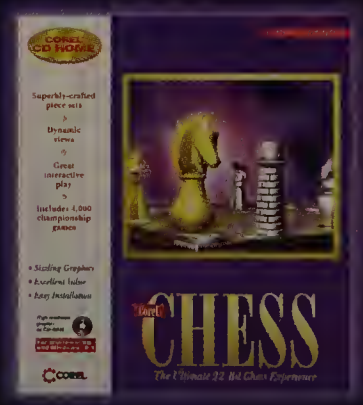

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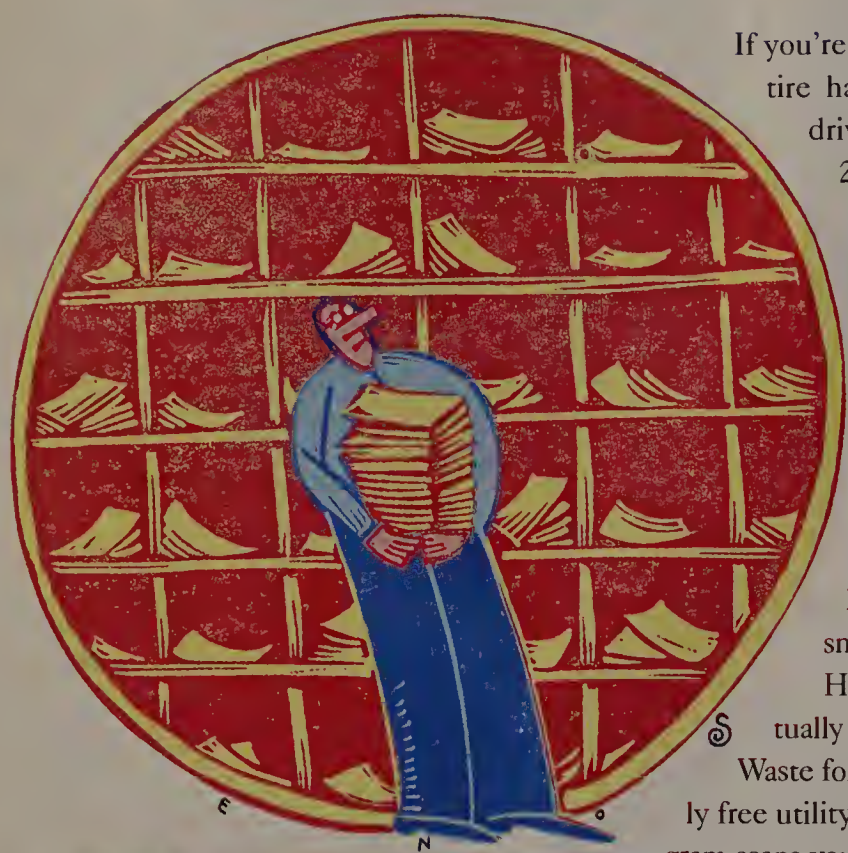
If you've got a large hard drive, you're probably wasting it.

BY STEVE BASS



What if I told you someone just locked you out of 24 percent of your hard drive? Sounds like something out of *The X-Files*, right? But over 291MB are missing from my 1.2GB hard disk, and no lawyer can get back what's legally mine.

Here's the dilemma. Both DOS and Windows 95 divide a hard drive into *clusters* of a certain size. If a file needs a small piece of a cluster, it takes the whole thing. A file only one byte long will take an entire cluster. A file that's one byte larger than a cluster will take two. It's like sticking a pencil in a desk drawer and not being allowed to put anything else into it. This wasted hard disk space is called *cluster overhang*, and you can't use it. Period.

CLUSTER HEADACHES

The bigger the clusters, the more space you waste. And the bigger your hard disk *partition*, the bigger the clusters. (Your hard drive can be divided into multiple partitions, each of which your computer treats as a separate drive.)

If you're like most people, your entire hard drive is one partition, drive C:. And if drive C: is 255MB, your clusters are 4K. If your hard disk is 256MB to 511MB, the clusters are 8K. Jump up to 1023MB (just a shade under a gigabyte), and the cluster size jumps with it to 16K. If, like me, your hard drive is over a gigabyte, each file takes up at least 32K. There are no small files anymore!

How much space are you actually losing? Download a copy of Waste for Windows, a cool, absolutely free utility that can tell you. The program scans your disk, determines the cluster size, and graphically displays how much space is being wasted. Better still, you'll be able to instantly see how much space you'd save if you had smaller partitions. Waste for Windows was written by Joseph T. Glosz Jr. and is available on PC World Online as **waste20.zip**.

SPLITTING DRIVES

Now that you know how bad the problem is, what's the solution? One is to use disk compression, which puts everything in one *very* big file and gets around the whole situation. But it can slow your PC down and produce compatibility problems. Or you could upgrade to OS/2 or Windows NT, which both use disk space more efficiently. But that's overkill.

The simple answer is to split the drive into two partitions, which would be drives C: and D:. If you've got a really big hard drive, you might set up three partitions. But don't get carried away—a herd of small "drives" is hard to manage.

Changing the partition used to be terrifying: Back up your hard disk, say a prayer, use DOS's FDISK, hope you've left the original partition big enough to accommodate its files, format the partitions, say another prayer, and restore the backup—all while your anxiety level is at the ceiling.

I took a risk and tried PartitionMagic 2.0, a slick, $50 utility designed to slice, dice, and even crinkle-cut my hard disk. In less than five minutes, I not only divvied up my hard drive, but changed my mind and divvied it up again—all without needing any DOS programs. I tried the utility on half a dozen systems, and it worked on all of them without so much as a glitch.

And it's easy to use. PartitionMagic stepped me through every part of the process, making sure that I didn't do any harm. For example, it wouldn't let me shrink a partition so small that I'd leave too little room for its files. PartitionMagic works in DOS, Windows 3.*x*, and Windows 95 (there's also an OS/2 version).

You know, rearranging your office is a lot better than buying more desk drawers.

- **PartitionMagic 2.0** for DOS and Windows $49.95, DOS and OS/2 version $69.95; PowerQuest; 800/379-2566, 801/226-8977, 801/226-8941 (fax); **http://www.powerquest.com**
  Reader service no. 650
- **Waste for Windows** free; Joseph T. Glosz Jr.; CompuServe, 72633,1646
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TALK TO US: You can e-mail the editors of the PC World @Home section at home@pcworld.com, and write to us at 501 Second St. #600, San Francisco, CA 94107. We're eager to hear your responses and opinions about any topic related to home computing.

ILLUSTRATIONS: TOP LEFT, RANDALL ENOS ; BOTTOM RIGHT, JOHN HERSEY

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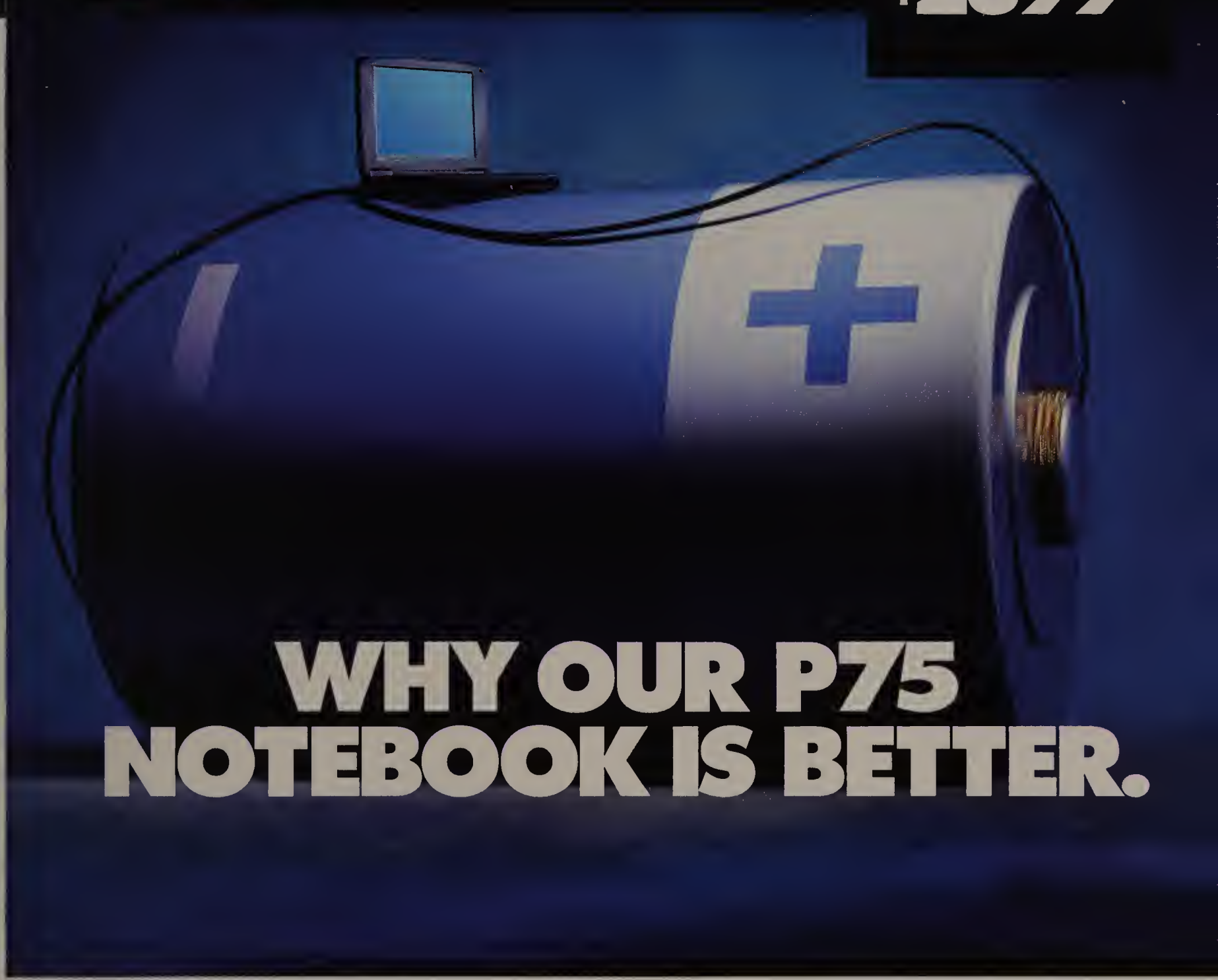

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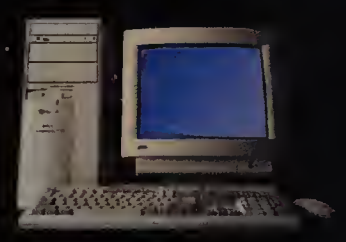

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